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Technical Memorandum

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To: Queens Development Group, LLC; QDG Hotel Partners, LLC; QDG 126th Street Partners, LLC; QDG Parking Partners, LLC; and QDG Retail Partners, LLC

From: Gerald Nicholls, P.E., CHMM

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Date: June 9, 2026

Re: In-situ Groundwater Treatment Remedial Design
Willets Point Development L-Parcel
Queens, New York
NYSDEC BCP Site No.: C241146H
Langan Project No.: 1705197605

Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C. (Langan) prepared this Remedial Design Document (RDD) on behalf of Queens Development Group, LLC; QDG Hotel Partners, LLC; QDG 126th Street Partners, LLC; QDG Parking Partners, LLC; and, QDG Retail Partners, LLC (the Volunteers) for the Willets Point Development L-Parcel Site (Site No. C241146H, herein referred to as "the Site").

This RDD describes the remedial approach for the supplemental groundwater treatment program required by the New York State Department of Environmental Conservation (NYSDEC) to further remediate the Site. The remedial approach described herein is informed by the results of a Bench-Scale ISCO Treatability Study Report, dated April 24, 2026, which demonstrated the effectiveness of in-situ chemical oxidation (ISCO) in reducing volatile organic compound (VOC) and semivolatile organic compound (SVOC) concentrations in groundwater and soil. The Bench-Scale ISCO Treatability Study Report is provided in Appendix A.

The following sections describe the treatment area, remedial technology alternatives, remedy selection, proposed supplemental in-situ groundwater treatment, and remedial performance monitoring.

1.0 SITE BACKGROUND

The Willets Point Development L-Parcel Site (Brownfield Cleanup Program [BCP] No. C241146H) encompasses approximately 1.120 acres. The Site was accepted into the BCP as part of the larger 22.868-acre Willets Point Development BCP Site (Site No. C241146), which was subsequently subdivided into eight separate BCP sites, including this Site (C241146H; BCA Index No. C241146H-09-23) and BCP sites C241146 and C241146B through C241146G in October 2023.

The Site is located in a former industrial area in the Borough of Queens, New York, and is identified as Queens Borough Tax Block 1833, Lots 158 and 172. The Site is bound by automotive repair and wrecking facilities to the north; Evergreen Recycling of Corona (EROC) to the east; the Willets Point Development SCA School BCP Site (Site No. C241146D) to the south; and automotive repair and wrecking facilities and Willets Point Boulevard, followed by the Willets Point Development Stadium BCP Site (Site No. C241146C), to the west. A Site Location and Layout Plan is provided as Figure 1.

To address petroleum-related target compounds detected in groundwater at concentrations exceeding the NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards and Guidance Values for Class GA groundwater (herein referred to the NYSDEC Standards and Guidance Values [SGVs]) during the Operable Unit 2 (OU-2) Remedial Investigation (RI), an in-situ groundwater treatment program was implemented in the eastern part of the Site during Remedial Action Work Plan (RAWP) implementation.

The in-situ groundwater treatment program was implemented in accordance with the NYSDEC-approved June 7, 2022 RAWP and the March 30, 2023 RAWP Modification Memorandum following excavation and off-site disposal of 2,507.49 tons of soil/fill and source material and installation of a groundwater containment cutoff wall. The in-situ groundwater treatment program consisted of direct in-situ mixing of chemical reagents within an approximately 12,000-square-foot area to a depth of approximately 7 to 9 feet below ground surface (bgs) (about elevation [el.] 2 to 4) following excavation and off-site disposal of fill to approximately 1 to 2 feet below the observed groundwater table (about el. 4).

The reagent selected for mixing in the June 7, 2022 RAWP was PetroFix™ (a water-based colloidal suspension of micron-scale activated carbon), in combination with an electron acceptor blend supplied by REGENESIS (San Clemente, California). Subsequent to RAWP approval, the in-situ remedial approach was augmented by the addition of ORC Advanced® (an engineered oxygen release compound) within a 4,100-square-foot section of the PetroFix™ treated area, as documented in the March 30, 2023 RAWP Modification Memorandum.

The in-situ groundwater treatment field implementation began on April 8, 2023, and was completed by April 13, 2023. The treatment area was backfilled with NYSDEC-approved ¾-inch quarry stone at the water table (about el. 4) to about 2 feet above the water table (about el. 6),

followed by about 4 feet of NYSDEC-approved clean fill (about el. 6 to 10), installation of a demarcation layer, and then a 2-foot composite cover system consisting of NYSDEC-approved clean fill and ¾-inch quarry stone, to a final grade of about el. 12 to 13.

Based on review of the May 2025 soil sample analytical results and the most recent quarterly groundwater sample analytical results collected in October 2025, the following contaminants of concern were detected in soil above Protection of Groundwater Soil Cleanup Objectives (PGW SCOs) and in groundwater above NYSDEC SGVs:

- 1,2,4-Trimethylbenzene
- 1,3,5-Trimethylbenzene
- Acetone
- Benzene
- Ethylbenzene
- n-Propylbenzene
- Tert-Butyl Methyl Ether (MTBE)
- Toluene
- Total xylenes

The remedial objective for the supplemental in-situ groundwater treatment is to address remaining impacts to soil and further reduce concentrations of petroleum-related compounds in groundwater, consistent with the NYSDEC Program Policy DER-10: Technical Guidance for Site Investigation and Remediation (DER-10). The most recent groundwater analytical results from the quarterly groundwater monitoring events are shown on Figure 2. A bench-scale treatability study was conducted to evaluate ISCO to address these residual impacts and is provided in Appendix C. This RDD summarizes the evaluation of remedial technology alternatives and presents the proposed design to address the residual impacts to soil concentrations above SCOs and groundwater concentrations above the NYSDEC SGVs at the site.

1.1 Previous Reports

The investigations listed below describe site conditions and were performed to characterize the nature and extent of contamination, as well as to evaluate environmental conditions and subsurface geology in support of developing supplemental remediation and mitigation strategies.

The following environmental investigations, work plans, and remedial reports were prepared for the Site:

- April 29, 2022, Remedial Investigation Report (RIR) for OU-2, prepared by Langan
- June 7, 2022, RAWP for OU-2, prepared by Langan
- March 30, 2023, RAWP Modification Memorandum, prepared by Langan
- June 23, 2025 Draft Site Management Plan (SMP) for Willets Point Development L-Parcel, prepared by Langan

- July 17, 2025 Draft Final Engineering Report (FER) for Willets Point Development L-Parcel, prepared by Langan
- January 15, 2026, Treatability Study Work Plan (TSWP) for Willets Point Development L-Parcel, prepared by Langan
- April 24, 2026 Bench-Scale ISCO Treatability Study Report, for Willets Point Development L-Parcel, prepared by Langan (located in Attachment B of this remedial design)

1.2 In-Situ Treatment Area

The supplemental in-situ groundwater treatment area represents the anticipated area of residual VOC impacts. A groundwater treatment area of approximately 36,700 square feet with a vertical treatment interval of 6 to 16 feet bgs is estimated based on May 2025 soil sample analytical results, quarterly groundwater monitoring analytical results, VOC delineation results (described in the Bench-Scale ISCO Treatability Study Report), and observed subsurface conditions. The quarterly groundwater monitoring and VOC delineation sampling identified VOCs exceeding NYSDEC SGV criteria within the proposed treatment footprint as shown on Figure 2. The selected treatment interval encompasses the observed zone of impacts and the groundwater table (approximately 6.5 feet bgs [el. 4.5]). The soil boring logs from the VOC delineation investigation are provided in Attachment B of the Bench-Scale ISCO Treatability Study Report. The proposed in-situ treatment area is shown in Figure 3.

1.2.1 Baseline Groundwater and Soil Sample Analytical Data

The baseline groundwater samples collected from J-MW118 and soil analytical samples collected from TS01_EL_4-6 (collected from 12-14 feet bgs), TS02_EL_1-3 (collected from 12-14 feet bgs), and TS03_EL_1-3 (collected from 9 to 11 feet bgs) are described below and the analytical results of the baseline groundwater and soil samples are summarized in Attachment F. The laboratory analytical reports are provided in Attachment G.

Twelve VOCs were detected at concentrations above the NYSDEC SGVs in J-MW118, as summarized below.

Analyte	NYSDEC SGVs	Unit	Detected Concentration above SGVs
VOCs			**J-MW118_013026**
1,2,4-Trimethylbenzene	5	ug/l	221 D
1,2-Dichlorobenzene	3	ug/l	3.6
1,3,5-Trimethylbenzene (Mesitylene)	5	ug/l	76.7
Benzene	1	ug/l	98.5 D
Ethylbenzene	5	ug/l	154 D
Isopropylbenzene (Cumene)	5	ug/l	14.6
M,P-Xylene	5	ug/l	599 D
n-Propylbenzene	5	ug/l	31.7
o-Xylene (1,2-Dimethylbenzene)	5	ug/l	296 D
Tert-Butyl Methyl Ether (MTBE)	10	ug/l	478 D
Toluene	5	ug/l	370 D
Total Xylenes	5	ug/l	895 D

At least ten VOCs were detected at concentrations above the PGW SCOs in soil samples collected as summarized in the table below.

Analyte	PGW SCOs	Unit	Minimum Detected Concentration above SCOs		Maximum Detected Concentration above SCOs	
1,2,4-Trimethylbenzene	5.9	mg/kg	35	TS02_EL_1-3	360	TS01_EL_4-6
1,3,5-Trimethylbenzene (Mesitylene)	3.1	mg/kg	13	TS02_EL_1-3	80	TS01_EL_4-6
Acetone	0.03	mg/kg	0.13	TS03_EL_1-3	0.32	TS02_EL_1-3
Benzene	0.06	mg/kg	0.1	TS02_EL_1-3	8.2	TS01_EL_4-6
Ethylbenzene	1	mg/kg	9	TS02_EL_1-3	36	TS03_EL_1-3
n-Butylbenzene	18	mg/kg	25	TS01_EL_4-6	25	TS01_EL_4-6
n-Propylbenzene	5	mg/kg	33	TS01_EL_4-6	33	TS01_EL_4-6
Tert-Butyl Methyl Ether (MTBE)	0.1	mg/kg	2.6	TS01_EL_4-6	2.6	TS01_EL_4-6
Toluene	0.7	mg/kg	9.5	TS02_EL_1-3	75	TS03_EL_1-3
Total Xylenes	1.2	mg/kg	46	TS02_EL_1-3	240	TS03_EL_1-3

2.0 REMEDIAL ALTERNATIVES ANALYSIS

Remedial action (RA) technology alternatives for supplemental in-situ groundwater treatment are evaluated herein. The analysis of RA technology alternatives includes preliminary screening of commonly implemented technologies to treat petroleum related hydrocarbons. Langan evaluated the following remedial technologies to address groundwater impacts within the treatment area.

- Thermal treatment
- Enhanced in-situ aerobic and anaerobic bioremediation
- Colloidal activated carbon
- In-situ chemical oxidation

Each of these remedial technologies is discussed in greater detail herein.

2.1 Thermal Remediation

Thermal remediation involves heating the subsurface to temperatures at or near the boiling point of water. By default, most primary contaminants of concern, particularly VOCs, are boiled off and captured with soil vapor extraction and treated above ground with a sorbent media. Thermal remediation technologies include thermal conductive heating (TCH) and electrical resistance heating (ERH). ERH requires soil moisture to convey electrical current and can therefore reach a maximum temperature equivalent to the boiling point of water (100°C) at treatment depth. Thus, choice of heating method is dictated by the type of contaminants that need to be addressed. Further, to effectively heat the subsurface to elevated temperatures, heat loss from the treatment area due to groundwater flow has to be minimized. Heat loss from the treatment area leads to ineffective and longer duration treatment. Given that the Site is close to a water body (i.e., approximately 600 feet east of Flushing Creek) and subject to tidal influences, the Site hydraulic conditions may result in inefficient heating. In addition, implementation of thermal remediation would require installation of heater wells, vapor recovery systems, and aboveground treatment equipment, which may require substantial energy input and associated infrastructure, resulting in relatively high capital and operational costs. Considering the implementation challenges associated with thermal treatment and given that thermal remediation is typically applied to source areas with high contaminant concentrations in soil and groundwater, including low-permeability zones, it is generally not suitable for large plume areas as it is not cost effective. Therefore, this RA technology alternative was eliminated at the screening level.

2.2 In-Situ Aerobic and Anaerobic Bioremediation

Aerobic bioremediation involves the use of oxygen as an electron acceptor to biologically degrade VOCs. Reaction kinetics are typically faster for aerobic compared with anaerobic bioremediation. Oxygen for enhancement of aerobic bioremediation can be supplied by injecting compounds that release oxygen into the saturated subsurface, typically over a period of several months (e.g., 3 to 12 months), depending on the groundwater flux. Additionally, oxygen for aerobic

bioremediation can be supplied through air sparging into the subsurface (biosparging) through a network of injection wells and aboveground equipment.

Anaerobic bioremediation involves the use of electron acceptors other than oxygen to degrade VOCs under reducing conditions. Anaerobic bioremediation typically uses sulfate (sulfate reduction), nitrate (nitrate reduction) or iron (naturally occurring iron can be used for iron reduction) as alternative electron acceptors. Typically, sulfate concentrations of several hundred mg/L are considered necessary for enhanced anaerobic bioremediation; therefore, amending the subsurface with sulfate may be required to promote sulfate reduction. The rate of contaminant degradation is relatively slow in anaerobic bioremediation compared to other in-situ remedial technologies.

While aerobic and anerobic bioremediation are effective in treating certain VOCs, rapid reductions in groundwater contaminant concentrations are unlikely to be achieved, making implementation of bioremediation challenging as an alternative remedy if any future Site development and construction is planned. Therefore, bioremediation is not retained as a primary remedial technology for supplemental groundwater treatment at this Site. However, bioremediation is retained for consideration as a follow-up remedy (as a polishing step). Anaerobic bioremediation (sulfate reduction) can be implemented as a follow-up to ISCO using persulfate application. Sulfate is generated as a product of persulfate based ISCO remedy. Therefore, ISCO application will potentially eliminate the need for a sulfate injection. As a follow up to ISCO, organic substrate (e.g., lactic acid or acetic acid) can be injected into the subsurface to provide a supplemental electron donor to promote anaerobic biodegradation of the residual contaminants and to adjust subsurface pH to neutral conditions (groundwater pH within the treatment area is between 7.6 and 10.4 standard units [S.U.], based on the October 2025 groundwater sampling event). The need for application of organic acid for pH adjustment can be evaluated after ISCO application. It is likely that acid generated from persulfate application itself is sufficient for neutralizing groundwater pH.

2.3 Colloidal Activated Carbon

Colloidal activated carbon (CAC) consists of micron-scale activated carbon particles, which are injected into the subsurface to reduce dissolved-phase hydrocarbons through sorption. Application of CAC-based products has shown success at various sites and is a well-established technology for reducing dissolved-phase contaminant concentrations. CAC can be applied with a single mobilization, thereby reducing the need for multiple rounds of injections.

CAC primarily functions as a sequestration technology and does not actively destroy contaminants. As a result, reliance on CAC alone may not achieve timely mass reduction where concentration of contaminants is more than the sorption capacity of CAC that can be practicably delivered into the subsurface. Under typical conditions, long-term effectiveness of CAC is often enhanced by biodegradation of sorbed contaminants. Application of CAC can be combined with

salts of electron acceptors (e.g., sodium nitrate and/or ammonium sulfate) to promote microbial degradation of contaminants sorbed onto the activated carbon particles.

The effectiveness of biodegradation at the Site is expected to be limited due to alkaline groundwater conditions (groundwater pH within the treatment area is between 7.6 and 10.4 S.U.). For biodegradation to proceed at optimal rates in groundwater, neutral conditions are necessary. The elevated pH levels are known to inhibit microbial activity and enzymatic processes necessary for biodegradation. Therefore, application of biodegradation in conjunction with CAC based sorption will require neutralization of groundwater pH.

In addition, CAC performance itself may be influenced by Site-specific conditions such as groundwater flow, effective distribution of the amendment, and sustained contact between contaminants and CAC particles. Given the limited potential for biodegradation under Site pH conditions and the reliance of CAC on sequestration rather than chemical destruction, CAC may be less effective as a stand-alone remedy for addressing residual VOC mass within the desired remedial timeframe. Therefore, CAC is not retained as a primary remedial technology for supplemental groundwater treatment at the Site. However, CAC may be considered as a supplementary or polishing technology, if warranted, following implementation of a primary treatment to reduce residual dissolved-phase contaminant concentrations.

2.4 In-Situ Chemical Oxidation

In-situ chemical oxidation (ISCO) involves the use of highly oxidizing chemical reagents to destroy contaminants of concern in soil and groundwater. Permanganate, Fenton's reagents, and activated persulfate are commonly used oxidants for in-situ applications. Permanganate is generally less effective in treating certain petroleum-related compounds, including benzene, toluene, ethylbenzene, and xylenes (BTEX).

Fenton's reagent, or Modified Fenton's reagents (MFR), is one of the strongest oxidants and can be effective in treating BTEX in the aqueous phase. Fenton's reagents are typically short-lived and may be less effective for treating contaminants that slowly diffuse out of soil. Fenton's reaction can also result in vigorous gas generation, which can pressurize the subsurface and lead to unintended migration pathways, potentially impacting nearby infrastructure.

Activated persulfate is effective in treating BTEX and other VOCs and has the potential for reducing groundwater VOC concentrations within a short duration. Additionally, persulfate promotes post-ISCO sulfate reduction (i.e., anaerobic biodegradation processes, as sulfate is a product of persulfate degradation), providing continued treatment after the oxidant is exhausted. ISCO using activated persulfate also generates acid which can aid in lowering the alkaline groundwater conditions at the Site.

Langan conducted a bench-scale treatability study to evaluate the total oxidant demand and effectiveness of ISCO within the treatment area. For the study, alkaline-activated sodium persulfate (Klozur® SP, a product of Evonik Active Oxygens, LLC [Evonik]) was used as the

remedial reagent. The results of the treatability study indicated that activated persulfate was effective in reducing VOC and SVOC concentrations in groundwater and/or soil. The Bench-Scale ISCO Treatability Study Report treatability study report is provided in Appendix A.

Based on the favorable results of the bench-scale treatability study, ISCO using alkali activated persulfate is considered a viable and effective remedial alternative for the Site. ISCO is also capable of achieving relatively rapid reductions in contaminant concentrations. Therefore, ISCO is retained as a primary remedial technology for the supplemental groundwater treatment at the Site.

3.0 SUPPLEMENTAL IN-SITU GROUNDWATER TREATMENT

The following sections describe the reagent selection, reagent demand and injection volume, and implementation method in the treatment area.

3.1 Reagent Selection

The reagents selected for the supplemental in-situ groundwater treatment include a combination of sodium persulfate (Klozur® SP) and potassium persulfate (Klozur® KP) and hydrated lime [$Ca(OH)_2$]. Activated persulfate is a strong oxidizing agent capable of degrading organic contaminants in soil and groundwater. Activated persulfate was selected based on the results of the bench-scale treatability study, which demonstrated effectiveness in reducing VOC and SVOC concentrations under laboratory conditions. Furthermore, activated persulfate provides effective contaminant destruction while minimizing potential adverse effects associated with more aggressive oxidants, such as excessive heat generation or rapid gas production.

Combined application of Klozur® SP and Klozur® KP was selected for the following reasons:

- Klozur® SP and Klozur® KP were both included as reagents to develop an effective and practically implementable design. Use of Klozur® SP alone would require injection of excessive volume, that was not considered feasible for the Site-specific conditions.
- The Klozur® SP, which has higher solubility as compared to Klozur® KP provides rapid oxidation of dissolved-phase VOCs in groundwater, while the Klozur® KP provides a slower release of persulfate, allowing for sustained oxidation over several months. The Site-specific conditions will dictate the longevity of persulfates in the subsurface.
- The extended persistence of the Klozur® KP component helps mitigate post-treatment rebound of dissolved-phase contaminants, which is commonly observed following injection-based remedial actions.
- The combined formulation provides sufficient oxidant persistence in the subsurface to allow effective contact with contaminants present in both dissolved and sorbed phases.

Following depletion of the oxidant, persulfate treatment may support longer-term microbial degradation (sulfate reduction) processes as sulfate is a product of persulfate based ISCO application.

Alkaline activation is well-suited to Site conditions, considering that native groundwater pH is already alkaline (groundwater pH within the treatment area is between 7.59 and 10.35 S.U.). These conditions lower the alkali required to raise groundwater pH for alkaline persulfate activation.

The safety data sheet (SDS) for the selected oxidant is provided in Appendix B.

3.2 Reagent Demand and Injection Volume

Reagent demand and injection volumes for the proposed ISCO treatment were developed based on the estimated treatment area and vertical treatment interval, bench-scale treatability study results, site-specific geochemical conditions, and Site constraints for injections. The selected ISCO program utilizes alkaline-activated persulfates, combination of sodium persulfate (Klozur® SP) and potassium persulfate (Klozur® KP), along with hydrated lime, prepared as a slurry in the field using water (herein referred to as persulfate slurry).

3.2.1 Reagent Demand

The estimated persulfate demand for the treatment area totals approximately 592,876 pounds, consisting of approximately 469,452 pounds of potassium persulfate (Klozur® KP) and 123,424 pounds of sodium persulfate (Klozur® SP). This corresponds to an overall persulfate demand of approximately 13 grams per kilogram of treated soil. The combined use of Klozur® SP and Klozur® KP is intended to provide both immediate oxidant availability and sustained oxidant persistence in the subsurface.

Hydrated lime will be used to address soil buffering capacity and support alkaline activation of persulfate. The estimated total hydrated lime demand is approximately 186,000 pounds.

The type of persulfate and alkali used and the dosing of persulfate considers the treatability results as well as injection volumes and provides maximum oxidant dosage that can be practically delivered into the subsurface.

3.2.2 Persulfate Slurry Preparation

Persulfate and alkali will be delivered as a slurry prepared at approximately 50 percent solids concentration. Based on this slurry concentration, the total estimated water required for slurry preparation is approximately 63,897 gallons. The persulfate slurry will be prepared in batches in the field at frequencies determined by the selected contractor.

3.2.3 Injection Volume and Layout

The total estimated injection volume required to deliver the persulfate slurry is approximately 102,119 gallons, to be injected during a single injection event. The treatment area will be addressed using an injection grid consisting of about 371 injection points, spaced approximately 10 feet on center, with an assumed radius of influence (ROI) of approximately 6 feet per injection point. The number of injection points are subject to change based on observed field conditions.

Each injection point will receive an injection volume of about 278 gallons of persulfate slurry, distributed over the targeted vertical treatment interval of 6 to 16 feet bgs. This corresponds to an estimated injection volume of approximately 28 gallons per vertical foot of treatment interval.

The proposed injection volumes and spacing are intended to achieve adequate oxidant distribution and overlap within the treatment zone to confirm effective contact with dissolved- and sorbed-phase contaminants.

The total ISCO solution volumes and reagent quantities are subject to change based on Site conditions and field observations during implementation. The proposed reagent demand calculations are provided in Table 1 and Evonik's proposed dosages are provided in Appendix C.

3.3 Permits and Notification

An Underground Injection Control (UIC) notification letter along with an Inventory of Injection Wells Form (USEPA Form 7520-16) and a copy of the approved RDD will be submitted to the United States Environmental Protection Agency (USEPA) prior to commencement of injection activities.

A permit for access to the city fire hydrant will be requested from the New York City Department of Environmental Protection (NYCDEP), if not previously obtained by the construction contractor. Hydrant water will be used to provide dilution water for injection activities. Water for injections may also be sourced from a New York State Department of Health (NYSDOH)-certified bulk water facility.

3.4 Field Implementation

The supplemental in-situ groundwater treatment activities will be completed in accordance with this RDD, the Construction Health and Safety Plan (CHASP) and the Quality Assurance Project Plan (QAPP). The CHASP is included as Appendix D. The site-specific QAPP is included as Appendix E. This section summarizes the approach to ISCO field implementation. The proposed injection plan is provided on Figure 3.

Mobilization and Staging of Reagents – The selected contractor will mobilize injection equipment and drill rig to the Site and receive and store the reagents. All reagents will be staged within secondary containment (Conex box). The reagents will be stored in a secure, cool (< 30°C) and dry location.

Reagent Mixing – The reagent solutions will be prepared in batches by mixing Klozur® KP, Klozur® SP, and hydrated lime with water in a mixing tank. Mixing will be performed in accordance with manufacturer recommendations and project-specific design requirements as described in section 3.2.

Reagent Injection – The prepared reagent solutions will be applied via injection at temporary injection locations using direct-push drilling with retractable stainless steel injection tooling. Injections will be performed from the bottom to top of each target interval (16 to 6 feet bgs) to promote uniform vertical distribution of the reagents. The reagent solutions will be pumped from the mixing tank to each injection location through an injection manifold equipped with valves and flow meters to regulate and monitor injection flow rates and volumes. The number and spacing

of injection points will be determined based on the required ROI and Site-specific conditions. An ROI of 6-feet is assumed for the layout of injection points and injection volume calculations. The injection points may be relocated in the field based on observed subsurface conditions, including refusal, preferential flow, or limited acceptance of fluids. All materials contacting reagents should be chemically compatible including tanks, pumps, injection rods, seals, gaskets, tubing, hoses, and mixing equipment.

If subsurface obstructions or drilling refusal are encountered, additional injection points may be advanced in order to deliver the designed injection volume or reagent mass. Application volumes, flow rates, and injection pressures will be monitored and adjusted during implementation to optimize distribution and minimize surfacing of the reagent solutions. After completion of injections, the injection tooling will be retracted, and the injection point will be abandoned by tremie grouting to grade using neat cement grout or hydrated pulverized bentonite. The proposed injection points are shown on Figure 3.

A Community Air Monitoring Plan (CAMP) will be implemented during ground-intrusive work. CAMP will include real-time monitoring for VOCs and particulates at the downwind perimeter of each designated work area when ground-intrusive work is in progress. Community air monitoring will be conducted in accordance with the NYSDOH Generic CAMP included as Appendix F. We anticipate maintaining two CAMP stations surrounding the work zone.

3.5 Implementation Monitoring

ISCO application monitoring will consist of batch, field, and process monitoring.

3.5.1 Batch Monitoring

During preparation of each batch of the reagent solutions, the quantities of Klozur® KP, Klozur® SP, hydrated lime, and water will be recorded in field logs for every batch of persulfate slurry prepared.

3.5.2 Field Monitoring

Monitoring will be performed in the field to identify leaks of the reagent solutions at the manifold and daylighting within and around the treatment zone. Any persulfate slurry that leaks or daylights will be promptly contained, recovered, neutralized, and managed on Site in accordance with applicable regulatory requirements. Groundwater quality monitoring in surrounding wells will be conducted during injections at the frequencies specified in the injection monitoring plan presented in Table 2. The wells will be monitored for depth to water and water quality parameters including pH, temperature, dissolved oxygen (DO), conductivity, oxidation reduction potential

(ORP) and color using a Horiba U-52 or equivalent water quality meter to assess the influence of injections at the surrounding monitoring wells.

3.5.3 Process Monitoring

Process parameters, including injection depth, pressure, flow rate, total volume, and quantity of reagents applied at each location will be recorded in detailed logs to assess and optimize the injection process. Field observations, including subsurface acceptance, refusal, and distribution of the reagent solutions will also be documented in field logs during implementation.

4.0 REMEDIAL PERFORMANCE MONITORING

Performance monitoring samples will be collected from the existing on-site groundwater monitoring wells. The monitoring well locations are shown in Figure 3.

Following completion of ISCO injections, post-treatment groundwater samples will be collected from wells J-MW117, J-MW118, J-MW201, J-MW202, J-MW203, and J-MW204 to assess the performance of the supplemental treatment. Groundwater samples will be collected 3-, 6-, 9-, and 12-months following the injection event. Prior to sample collection, the head space of each well will be screened for organic vapors with a photoionization detector (PID), and the depth to water will be measured with an oil/water interface probe. Geochemical parameters (e.g., DO, ORP, specific conductivity, pH, temperature, and turbidity) will be recorded during sampling. The groundwater samples, including Quality Assurance/Quality Control (QA/QC) samples, will be collected using low-flow sampling techniques and submitted to an NYSDOH Environmental Laboratory Approval Program (ELAP)-certified analytical laboratory for the analysis of Part 375 and Target Compound List (TCL)-listed VOCs, SVOCs, and sulfate. The performance monitoring data will be compared against the NYSDEC SGVs. Groundwater data collected during the October 2025 quarterly groundwater monitoring event prior to ISCO injections will be used for baseline comparison.

Following completion of the supplemental treatment and initial performance monitoring, additional remedial injections may be required based on an evaluation of the performance monitoring data, which may include continuation of the persulfate based ISCO or the injection of organic acid to condition groundwater to promote anaerobic bioremediation. Groundwater monitoring to assess the efficacy of treatment and natural attenuation will continue on a quarterly basis until groundwater remedial action objectives (RAOs) are achieved and the NYSDEC and the NYSDOH have granted permission to discontinue quarterly monitoring (anticipated to be one year).

4.1 Green Remediation Standards

Green remediation principles and techniques will be implemented to the extent feasible in the design, implementation, and site management of the remedy as per DER-31. The major green remediation components are as follows;

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- Reducing direct and indirect greenhouse gases and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy;
- Conserving and efficiently managing resources and materials;

- Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste;
- Maximizing habitat value and creating habitat when possible;
- Fostering green and healthy communities and working landscapes with balance ecological, economic and social goals; and
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development;
- Additionally, to incorporate green remediation principles and techniques to the extent feasible in the future development at this site, any future on-site buildings will include, at a minimum, a 20-mil vapor barrier/waterproofing membrane on the foundation to improve energy efficiency as an element of construction.

5.0 REPORTING

The supplemental in-situ groundwater treatment activities, including injection volumes, reagent dosage, field monitoring data, and first post-treatment performance monitoring results will be reported to the NYSDEC in the revised Final Engineering Report (FER). Status updates for the remedial injections will be summarized in daily field reports and monthly BCP reports, as discussed in the RAWP and SMP. Subsequent post-treatment performance monitoring data will be reported to the NYSDEC in quarterly groundwater monitoring reports.

6.0 SCHEDULE

The in-situ groundwater treatment is estimated to take approximately 4 weeks to complete, and is anticipated to begin on July 20, 2026. It is anticipated that the first post-treatment groundwater monitoring samples will be collected on September 21, 2026.

Scope Item	Proposed Completion Date
Treatment Implementation Start	July 20, 2026
Treatment Implementation Completion	August 14, 2026
First Round of Sampling	September 21, 2026

Assuming the first round of sampling demonstrates remedial performance in accordance with the RD, a 2026 certificate of completion is anticipated.

7.0 CERTIFICATION

I, Gerald Nicholls, PE, certify that I am currently a NYS registered professional engineer as defined in 6 NYCRR Part 375 and that this Remedial Design was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10) and that all activities were performed in full accordance with the DER-approved work plan and any DER-approved modifications.

NYS Professional Engineer	06/09/2026 Date	Signature

Figures

Figure 1: Site Location and Layout Plan
Figure 2: Groundwater Sample Analytical Results
Figure 3: Proposed Injection Plan

Tables

Table 1: Reagent Volume
Table 2: Injection Monitoring Plan

Appendix

Appendix A: Bench-Scale ISCO Treatability Study Report
Appendix B: Safety Data Sheets
Appendix C: Evonik Design Package
Appendix D: Construction Health and Safety Plan
Appendix E: Quality Assurance Project Plan
Appendix F: Community Air Monitoring Plan

FIGURES

Notes:
1. Light Gray Canvas basemap provided through Langan's Esri and ArcGIS software licensing and ArcGIS Online.
2. Tax parcel data provided by the New York City Department of City Planning, MapPLUTO 23v2, and a survey prepared by Langan, July 28, 2023.
3. BCP - Brownfield Cleanup Program

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Project
WILLETS POINT DEVELOPMENT L-PARCEL
BCP SITE NO. C241146H
QUEENS NEW YORK

Figure Title
SITE LOCATION AND LAYOUT PLAN

Project No.	Figure No.
170197601	1
Date: 4/24/2026	
Scale: 1"=250'	
Drawn By: GS	

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Location	J-MW205	J-MW205	J-MW205
Sample Name	J-MW205_053025	J-MW205_072325	J-MW205_102025
Sample Date	05/30/2025	07/23/2025	10/20/2025
VOCs			
1,2,4,5-Tetramethylbenzene	NA	<200 U	<40 U
1,2,4-Trimethylbenzene	**55.3**	**44**	**72**
1,2-Dichlorobenzene	<0.5 U	<25 U	<50 U
1,2-Dichloroethane	<0.5 U	<5 U	<10 U
1,2-Dichloropropane	<0.5 U	<10 U	<20 U
1,3,5-Trimethylbenzene (Mesitylene)	**12.2 J**	**14 J**	**24 J**
1,4-Dichlorobenzene	<0.5 U	<25 U	<50 U
Acetone	36.5	**330**	**470**
Benzene	**29.1**	**36**	**55**
Bromomethane	<2 U	<25 U	<50 U
Chlorobenzene	<0.5 U	<25 U	<50 U
Chloroethane	<0.5 U	<25 U	<50 U
Chloromethane	<0.5 U	<25 U	<50 U
Cymene	2.87	<25 U	<50 U
Ethylbenzene	**57.8**	**28**	**40 J**
Hexachlorobutadiene	<0.5 U	<25 U	<50 U
Isopropylbenzene (Cumene)	2.61	<25 U	<50 U
M,P-Xylene	**116**	**100**	**150**
Methyl Ethyl Ketone (2-Butanone)	<0.5 U	26 J	<100 U
Methylene Chloride	**6.06 J**	<25 U	<50 U
n-Butylbenzene	<0.5 U	<25 U	<50 U
n-Propylbenzene	**5.39**	<25 U	<50 U
o-Xylene (1,2-Dimethylbenzene)	**59.8**	**59**	**79**
Sec-Butylbenzene	<0.5 U	**32**	<50 U
Styrene	<0.5 U	<25 U	<50 U
Tert-Butyl Methyl Ether (MTBE)	**842 D**	**2,600**	**1,800**
Toluene	**175 D**	**150**	**250**
Total Xylenes	**175**	**160**	**230**
SVOCs			
1,2-Dichlorobenzene	NA	<2 U	<10 U
1,2-Diphenylhydrazine	<5 U	NA	NA
1,4-Dichlorobenzene	NA	<2 U	<10 U
1,4-Dioxane (P-Dioxane)	NA	**12.4**	**10**
2,4-Dichlorophenol	<5 U	**5.8**	<25 U
2,4-Dimethylphenol	**11.3**	**28**	**29**
2,4-Dinitrotoluene	<5 U	<5 U	<25 U
3,3'-Dichlorobenzidine	3.63 J	<5 U	<25 U
Acenaphthene	0.8 D	1.2	2
Benzo(a)anthracene	**0.7 D**	**3.7**	**2.3**
Benzo(a)pyrene	<0.5 U	<0.1 U	**0.12**
Benzo(b)fluoranthene	<0.5 U	<0.1 U	**0.18**
Benzo(k)fluoranthene	<0.5 U	<0.1 U	**0.05 J**
Biphenyl (Diphenyl)	<5 U	<2 U	<10 U
Bis(2-ethylhexyl) phthalate	<5 U	4.7	<15 U
Chrysene	<0.5 U	**9.22**	**0.19**
Diethyl phthalate	<5 U	<5 U	<25 U
Hexachlorobutadiene	<5 U	<0.5 U	<25 U
Indeno(1,2,3-cd)pyrene	<0.5 U	<0.1 U	<0.1 U
Naphthalene	**14.5 D**	**25**	**30**
Pentachlorophenol	<2.5 U	**72**	**3.6**
Phenol	**173**	**280**	**130**

Location	J-MW118	J-MW118	J-MW118	J-MW118	J-MW118	J-MW118	J-MW118	J-MW118	J-MW118	J-MW118
Sample Name	J-MW118_062623	J-MW118_092723	J-MW118_122823	J-MW118_040424	J-MW118_071624	J-MW118_020725	J-MW118_053025	J-MW118_072325	J-MW118_102025	
Sample Date	06/26/2023	09/27/2023	12/27/2023	04/04/2024	07/16/2024	02/07/2025	05/30/2025	07/23/2025	10/20/2025	
VOCs										
1,2,4,5-Tetramethylbenzene	NA	NA	NA	NA	NA	NA	NA	**14 J**	**73 J**	
1,2,4-Trimethylbenzene	**19.6**	**9.29**	<0.5 U	<0.5 U	**12.5**	**14.2**	**293 D**	**300 J**	**180**	
1,2-Dichlorobenzene	0.37 J	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	**4.17**	<12 UJ	<25 U	
1,2-Dichloroethane	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<2.5 UJ	<5 U	
1,2-Dichloropropane	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 UJ	<10 U	
1,3,5-Trimethylbenzene (Mesitylene)	**6.3**	2.91	<0.5 U	<0.5 U	3.9	3.41	<0.5 U	**67.8 J**	**70 J**	**48**
1,4-Dichlorobenzene	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<12 UJ	<25 U	
Acetone	5.99 J	<4.39 U	3.5	<2.96 U	2.3	6.07	**58.7**	**100 J**	**83**	
Benzene	**4.07**	**3.79**	0.52	**1.67**	**3.42**	**75**	**142 J**	**81 J**	**86**	
Bromomethane	<0.5 U	<0.5 UJ	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<2 U	<12 UJ	<25 U	
Chlorobenzene	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<12 UJ	<25 U	
Chloroethane	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<12 UJ	<25 U	
Chloromethane	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<12 UJ	<25 U	
Cymene	NA	NA	NA	NA	NA	<0.6 U	1.64	<12 UJ	<25 U	
Ethylbenzene	**16**	**7.64**	<0.5 U	<0.5 U	**10.1**	**423 D**	**110 J**	**160 J**	**110**	
Hexachlorobutadiene	<0.5 U	<0.5 U	<0.5 U	<0.5 UJ	<0.5 U	<0.5 U	<0.5 U	<12 UJ	<25 U	
Isopropylbenzene (Cumene)	0.82	0.42 J	<0.5 U	<0.5 U	0.56	1.69	**12 D**	**10 J**	<25 U	
M,P-Xylene	**56.5**	**28.5**	<1 U	<1 U	**28.8**	**38.2**	**846 D**	**700 J**	**490**	
Methyl Ethyl Ketone (2-Butanone)	0.75	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<25 UJ	<50 U	
Methylene Chloride	<2 U	<2 U	<2 U	<2 U	<2 U	<2 U	**5.01 J**	<12 UJ	<25 U	
n-Butylbenzene	0.93	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	2.66	<12 UJ	<25 U	
n-Propylbenzene	2.4	0.91	<0.5 U	<0.5 U	1.56	1.66	**29.9**	**20 J**	**16 J**	
o-Xylene (1,2-Dimethylbenzene)	**33.2**	**14.5**	0.42 J	0.61	**14**	**18.6**	**426 D**	**320 J**	**220**	
Sec-Butylbenzene	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	2.21	<12 UJ	<25 U	
Styrene	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	**6.3 J**	<25 U	
Tert-Butyl Methyl Ether (MTBE)	**39**	**160**	**539 D**	**150**	**202 D**	**262 D**	**504 D**	**530 J**	**770**	
Toluene	**20.8**	2.27	<0.5 U	<0.5 U	**18.2**	**33.1**	**696 D**	**500 J**	**320**	
Total Xylenes	**89.8**	**43**	<1.5 U	0.86 J	**42.8**	**56.8**	**1,270 D**	**1,000 J**	**710**	
SVOCs										
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	2.4	19 J	
1,2-Diphenylhydrazine	<5.56 U	<5 U	<5 U	<5 U	<5 U	<5.56 U	<5 U	NA	NA	
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	<2 U	<2 U	
1,4-Dioxane (P-Dioxane)	**0.528**	**0.784**	**0.64**	**0.864**	**1.15**	**1.28**	NA	**3.3**	**4.59**	
2,4-Dichlorophenol	<5.56 U	<5 U	<5 U	<5 U	<5 U	<5.56 U	<5 U	**2.4 J**	<5 U	
2,4-Dimethylphenol	<5.56 U	<5 U	<5 U	<5 U	<5 U	<5.56 U	**12.9**	**8.4**	**4.8 J**	
2,4-Dinitrotoluene	<5.56 U	<5 U	<5 U	<5 U	<5 U	**15.3**	<5 U	<5 U	<5 U	
3,3'-Dichlorobenzidine	<5.56 U	<5 U	<5 U	<5 U	<5 U	<5.56 U	<5 U	<5 U	<5 U	
Acenaphthene	0.0889	<0.05 U	<0.05 U	0.06	0.09	<0.0556 U	<0.5 U	0.85	0.78	
Benzo(a)anthracene	**0.0667**	<0.05 U	<0.05 U	**0.08**	**0.22**	**0.0889**	<0.5 U	**0.57**	**0.6**	
Benzo(a)pyrene	<0.0556 U	<0.05 U	<0.05 U	<0.05 U	<0.05 U	<0.0556 U	<0.5 U	**0.17**	**0.06 J**	
Benzo(b)fluoranthene	<0.0556 U	<0.05 U	<0.05 U	<0.05 U	<0.05 U	<0.0556 U	<0.5 U	**0.34**	**0.09 J**	
Benzo(k)fluoranthene	<0.0556 U	<0.05 U	<0.05 U	<0.05 U	<0.05 U	<0.0556 U	<0.5 U	**0.06 J**	**0.05 J**	
Biphenyl (Diphenyl)	<5.56 U	<5 U	<5 U	<5 U	<5 U	<5.56 U	<5 U	<2 U	<2 U	
Bis(2-ethylhexyl) phthalate	4.47 J	<0.5 U	0.6	<0.5 U	<0.5 U	<0.556 U	<5 U	4.9	<3 U	
Chrysene	<0.0556 U	<0.05 U	<0.05 U	**0.07**	**0.23**	**0.1**	<0.5 U	**0.17**	**0.08 J**	
Diethyl phthalate	<5.56 U	<5 U	<5 U	<5 U	<5 U	<5.56 U	<5 U	<5 U	<5 U	
Hexachlorobutadiene	<0.556 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.556 U	<5 U	<0.5 U	<0.5 U	
Indeno(1,2,3-cd)pyrene	<0.0556 U	<0.05 U	<0.05 U	<0.05 U	<0.05 U	<0.0556 U	<0.5 U	**0.13**	**0.07 J**	
Naphthalene	0.267	<0.05 U	0.14	0.6 J	2.06	5.06	**36.2 D**	**49**	**75**	
Pentachlorophenol	<0.278 U	<0.25 U	<0.25 U	<0.25 U	<0.278 U	<2.5 U	**3.2**	**2.5**	0.34 J	
Phenol	<5.56 U	<5 U	<5 U	<5 U	<5.56 U	**11.2**	**47**	**11**		

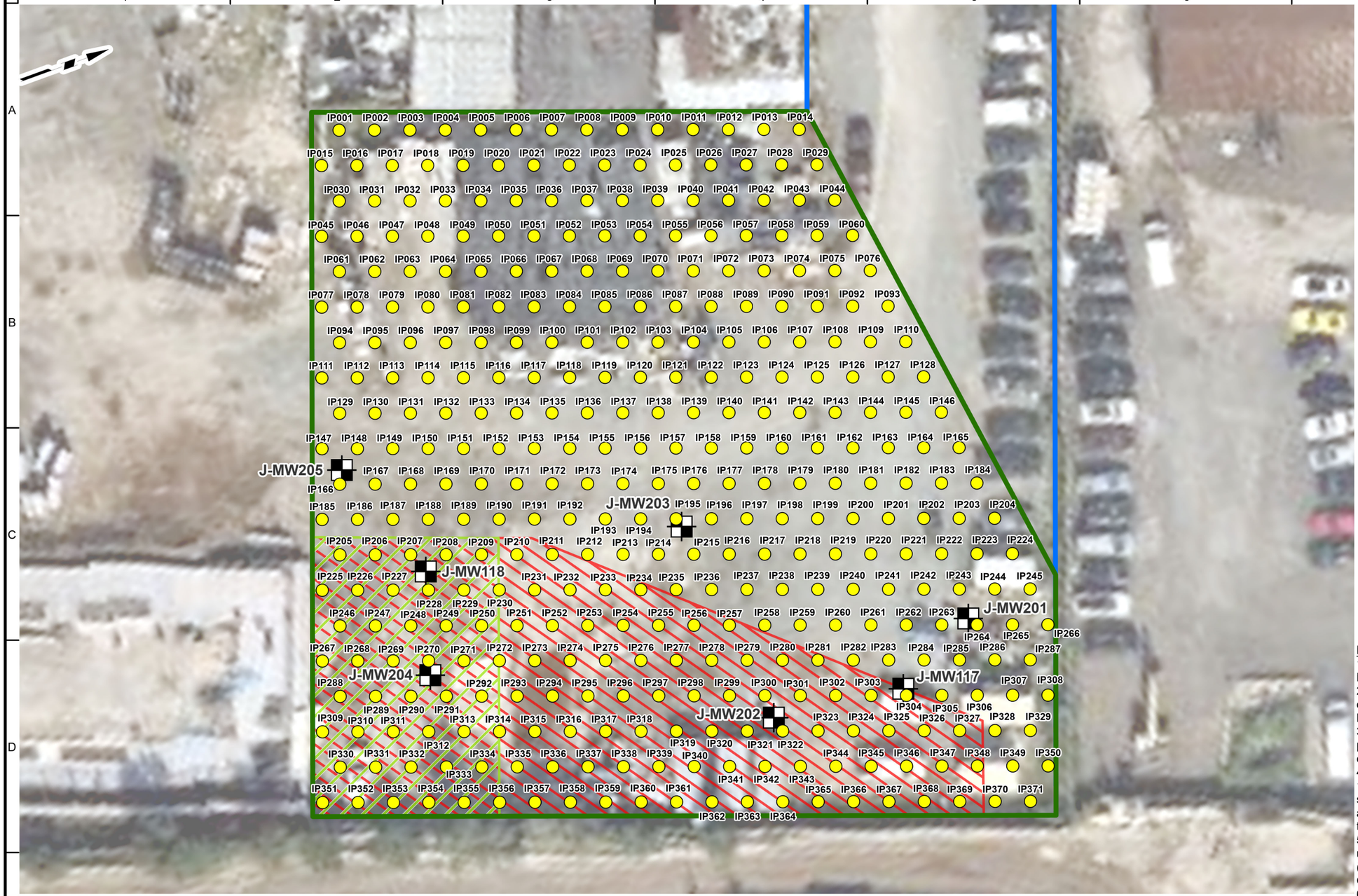
Location	J-MW203	J-MW203	J-MW203
Sample Name	J-MW203_052925	J-MW203_072325	J-MW203_102025
Sample Date	05/29/2025	07/23/2025	10/20/2025
VOCs			
1,2,4,5-Tetramethylbenzene	NA	<4 U	<10 U
1,2,4-Trimethylbenzene	**19.7**	1.6 J	**7.2**
1,2-Dichlorobenzene	<0.5 U	<5 U	<12 U
1,2-Dichloroethane	<0.5 U	<1 U	<2.5 U
1,2-Dichloropropane	<0.5 U	<2 U	<5 U
1,3,5-Trimethylbenzene (Mesitylene)	**5.47**	<5 U	<12 U
1,4-Dichlorobenzene	<0.5 U	<5 U	<12 U
Acetone	**53.5**	<10 U	<25 U
Benzene	**7.87**	**2.5**	**7.7**
Bromomethane	<2 U	<5 U	<12 U
Chlorobenzene	<0.5 U	<5 U	<12 U
Chloroethane	<0.5 U	<5 U	<12 U
Chloromethane	1.33	<5 U	<12 U
Cymene	<0.5 U	<5 U	<12 U
Ethylbenzene	**16.6**	<5 U	4.9 J
Hexachlorobutadiene	<0.5 U	<5 U	<12 U
Isopropylbenzene (Cumene)	0.95	<5 U	<12 U
M,P-Xylene	**33.2**	2.5 J	**17**
Methyl Ethyl Ketone (2-Butanone)	3.13	<10 U	<25 U
Methylene Chloride	**13.2 J**	<5 U	<12 U
n-Butylbenzene	<0.5 U	<5 U	<12 U
n-Propylbenzene	2.05	<5 U	<12 U
o-Xylene (1,2-Dimethylbenzene)	**11.6**	<5 U	**6.1 J**
Sec-Butylbenzene	<0.5 U	<5 U	<12 U
Styrene	2.09	<5 U	<12 U
Tert-Butyl Methyl Ether (MTBE)	**105**	**140**	**130**
Toluene	4.99	<5 U	3.9 J
Total Xylenes	**44.7**	2.5 J	**23 J**
SVOCs			
1,2-Dichlorobenzene	NA	<2 U	<2 U
1,2-Diphenylhydrazine	<5 U	NA	NA
1,4-Dichlorobenzene	NA	<2 U	<2 U
1,4-Dioxane (P-Dioxane)	NA	**2.3 J**	**2.79**
2,4-Dichlorophenol	<5 U	<5 U	<5 U
2,4-Dimethylphenol	<5 U	<5 U	**2.8 J**
2,4-Dinitrotoluene	<5 U	<5 U	<5 U
3,3'-Dichlorobenzidine	<5 U	<5 U	<5 U
Acenaphthene	<0.05 U	0.36	0.92
Benzo(a)anthracene	<0.05 U	**0.13**	**0.2 J**
Benzo(a)pyrene	<0.05 U	<0.1 U	**0.04 J**
Benzo(b)fluoranthene	<0.05 U	**0.03 J**	**0.05 J**
Benzo(k)fluoranthene	<0.05 U	<0.1 U	<0.1 U
Biphenyl (Diphenyl)	<5 U	<2 U	<2 U
Bis(2-ethylhexyl) phthalate	0.76	<3 U	1.9 J
Chrysene	**0.18**	**0.06 J**	**0.04 J**
Diethyl phthalate	<5 U	<5 U	<5 U
Hexachlorobutadiene	<0.5 U	<0.5 U	<0.5 U
Indeno(1,2,3-cd)pyrene	<0.05 U	<0.1 U	**0.02 J**
Naphthalene	0.11	1.2	3.2
Pentachlorophenol	<0.25 U	<0.8 U	<0.8 U
Phenol	<5 U	<5 U	<5 U

Location	J-MW201	J-MW201	J-MW201
Sample Name	J-MW201_053025	J-MW201_072325	J-MW201_102025
Sample Date	05/30/2025	07/23/2025	10/20/2025
VOCs			
1,2,4,5-Tetramethylbenzene	NA	**14**	**22**
1,2,4-Trimethylbenzene	**71 D**	**43**	**54**
1,2-Dichlorobenzene	<2.5 U	<12 U	1.6 J
1,2-Dichloroethane	<2.5 U	<2.5 U	<0.5 U
1,2-Dichloropropane	<2.5 U	<5 U	<1 U
1,3,5-Trimethylbenzene (Mesitylene)	**16.2 J**	**11 J**	**12**
1,4-Dichlorobenzene	<2.5 U	<12 U	<2.5 U
Acetone	**60.4 D**	**52**	35
Benzene	**50.2 D**	**57**	**71**
Bromomethane	<10 U	<12 U	<2.5 U
Chlorobenzene	<2.5 U	<12 U	1.6 J
Chloroethane	<2.5 U	<12 U	<2.5 U
Chloromethane	<2.5 U	<12 U	<2.5 U
Cymene	<2.5 U	<12 U	1.6 J
Ethylbenzene	**56.9**	**17**	**20**
Hexachlorobutadiene	<2.5 U	<12 U	<2.5 U
Isopropylbenzene (Cumene)	**17.9 D**	**12**	**20**
M,P-Xylene	**110 D**	**78**	**81**
Methyl Ethyl Ketone (2-Butanone)	<2.5 U	<25 U	<5 U
Methylene Chloride	<10 U	<12 U	<2.5 U
n-Butylbenzene	3.79 D	3.6 J	**5.6**
n-Propylbenzene	**39.3 D**	**31**	**47**
o-Xylene (1,2-Dimethylbenzene)	**72.3 D**	**40**	**53**
Sec-Butylbenzene	3.65 D	<12 U	4
Styrene	<2.5 U	<12 U	1.8 J
Tert-Butyl Methyl Ether (MTBE)	**141 D**	**92**	**110**
Toluene	**72.9 D**	**46**	**50**
Total Xylenes	**182 D**	**130**	**130**
SVOCs			
1,2-Dichlorobenzene	NA	1.1 J	0.99 J
1,2-Diphenylhydrazine	<5 U	NA	NA
1,4-Dichlorobenzene	NA	<2 U	<2 U
1,4-Dioxane (P-Dioxane)	NA	**10.5**	**11.6**
2,4-Dichlorophenol	**5.44**	<5 U	<5 U
2,4-Dimethylphenol	**59.4 D**	**120**	**110**
2,4-Dinitrotoluene	<5 U	<5 U	<5 U
3,3'-Dichlorobenzidine	**7.7**	<5 U	<5 U
Acenaphthene	1.6 D	3.2	4.3
Benzo(a)anthracene	<0.5 U	**0.86**	**0.55**
Benzo(a)pyrene	<0.5 U	<0.1 U	<0.1 U
Benzo(b)fluoranthene	<0.5 U	<0.1 U	**0.11**
Benzo(k)fluoranthene	<0.5 U	<0.1 U	**0.13**
Biphenyl (Diphenyl)	<5 U	<2 U	<2 U
Bis(2-ethylhexyl) phthalate	<5 U	**7.5**	<3 U
Chrysene	<0.5 U	**0.31**	**0.21**
Diethyl phthalate	<5 U	<5 U	<5 U
Hexachlorobutadiene	<5 U	<0.5 U	<0.5 U
Indeno(1,2,3-cd)pyrene	<0.5 U	<0.1 U	**0.07 J**
Naphthalene	**19 D**	**34**	**36**
Pentachlorophenol	**3.8 D**	**2.5**	0.3 J
Phenol	**15.4**	**29**	<5 U

Location	J-MW204	J-MW204	J-MW204
Sample Name	J-MW204_052925	J-MW204_072325	J-MW204_102025
Sample Date	05/29/2025	07/23/2025	10/20/2025
VOCs			
1,2,4,5-Tetramethylbenzene	NA	<200 U	<40 U
1,2,4-Trimethylbenzene	**52.3**	**27**	**34 J**
1,2-Dichlorobenzene	<0.5 U	<25 U	<50 U
1,2-Dichloroethane	<0.5 U	<5 U	<10 U
1,2-Dichloropropane	<0.5 U	<10 U	<20 U
1,3,5-Trimethylbenzene (Mesitylene)	**9.52**	**9 J**	<50 U
1,4-Dichlorobenzene	<0.5 U	<25 U	<50 U
Acenone	**83**	**55**	**310**
Benzene	**20.7**	**7**	**27**
Bromomethane	<2 U	<25 U	<50 U
Chlorobenzene	<0.5 U	<25 U	<50 U
Chloroethane	<0.5 U	<25 U	<50 U
Chloromethane	<0.5 U	<25 U	<50 U
Cymene	0.83	<25 U	<50 U
Ethylbenzene	**50.3**	**11 J**	**29 J**
Hexachlorobutadiene	<0.5 U	<25 U	<50 U
Isopropylbenzene (Cumene)	3.43	<25 U	<50 U
M,P-Xylene	**101**	**33**	**80**
Methyl Ethyl Ketone (2-Butanone)	<0.5 U	<50 U	<100 U
Methylene Chloride	<2 U	<25 U	<50 U
n-Butylbenzene	<0.5 U	<25 U	<50 U
n-Propylbenzene	4.34	<25 U	<50 U
o-Xylene (1,2-Dimethylbenzene)	**64.4**	**19 J**	**48 J**
Sec-Butylbenzene	0.55	<25 U	<50 U
Styrene	<0.5 U	<25 U	<50 U
Tert-Butyl Methyl Ether (MTBE)	**144**	**88**	**85**
Toluene	**46.6**	**12 J**	**48 J**
Total Xylenes	**165**	**52 J**	**140 J**
SVOCs			
1,2-Dichlorobenzene	NA	<2 U	<10 U
1,2-Diphenylhydrazine	<5 U	NA	NA
1,4-Dichlorobenzene	NA	<2 U	<10 U
1,4-Dioxane (P-Dioxane)	NA	**2.92 J**	**5.67**
2,4-Dichlorophenol	<5 U	<5 U	<25 U
2,4-Dimethylphenol	**6.6**	**34**	**36**
2,4-Dinitrotoluene	<5 U	<5 U	<25 U
3,3'-Dichlorobenzidine	<5 U	<5 U	<25 U
Acenaphthene	<2.5 U	**10.4 J**	<5 U
Benzo(a)anthracene	<2.5 U	<2.5 U	**1.1**
Benzo(a)pyrene	<2.5 U	<2.5 U	**0.59**
Benzo(b)fluoranthene	<2.5 U	<2.5 U	**0.84 J**
Benzo(k)fluoranthene	<2.5 U	<2.5 U	**1.1**
Biphenyl (Diphenyl)	<5 U	<5 U	<10 U
Bis(2-ethylhexyl) phthalate	<5 U	<3 U	<15 U
Chrysene	**2.5 D**	**0.32**	**0.2**
Diethyl phthalate	<5 U	<5 U	<25 U
Hexachlorobutadiene	<25 U	<0.5 U	<0.5 U
Indeno(1,2,3-cd)pyrene	<2.5 U	**0.22**	**0.17**
Naphthalene	**12 D**	9.3	10
Pentachlorophenol	<12.5 U	**1.5**	0.44 J
Phenol	**2.5 J**	**23**	**50**

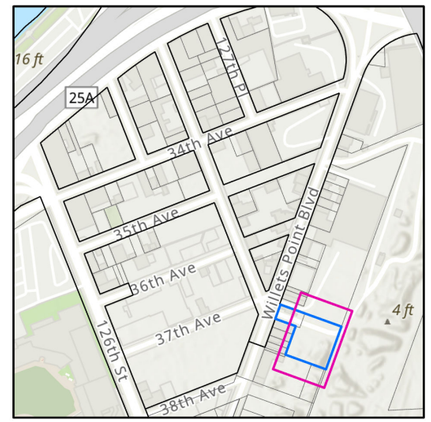
Location	J-MW202	J-MW202	J-MW202	J-MW202
Sample Name	J-MW202_052925	DUP01_052925	J-MW202_072325	J-MW202_102025
Sample Date	05/29/2025	05/29/2025	07/23/2025	10/20/2025
VOCs				
1,2,4,5-Tetramethylbenzene	NA	NA	<10 U	<40 U
1,2,4-Trimethylbenzene	**43**	**49**	**41**	**52**
1,2-Dichlorobenzene	0.82	0.84	<12 U	<50 U
1,2-Dichloroethane	<0.5 U	<0.5 U	<2.5 U	<10 U
1,2-Dichloropropane	<0.5 U	<0.5 U	<5 U	<20 U
1,3,5-Trimethylbenzene (Mesitylene)	**9.31**	**10.6**	**13**	**19 J**
1,4-Dichlorobenzene	<0.5 U	<0.5 U	<12 U	<50 U
Acetone	**111**	**141**	**91**	**520**
Benzene	**27**	**30.5**	**20**	**40**
Bromomethane	<2 U	<2 U	<12 U	<50 U
Chlorobenzene	<0.5 U	<0.5 U	<12 U	<50 U
Chloroethane	<0.5 U	<0.5 U	<12 U	<50 U
Chloromethane	0.94	<0.5 U	<12 U	<50 U
Cymene	0.77	0.78	<12 U	<50 U
Ethylbenzene	**54**	**61.1**	**30**	**42 J**
Hexachlorobutadiene	<0.5 U	<0.5 U	<12 U	<50 U
Isopropylbenzene (Cumene)	7.84	9.2	<12 U	<50 U
M,P-Xylene	**108**	**122**	**120**	**150**
Methyl Ethyl Ketone (2-Butanone)	34.8	37.6	19 J	**89 J**
Methylene Chloride	**13.6 J**	**11.1 J**	<12 U	<50 U
n-Butylbenzene	<0.5 U	<0.5 U	<12 U	<50 U
n-Propylbenzene	4.87	**5.49**	4 J	<50 U
o-Xylene (1,2-Dimethylbenzene)	**68.9**	**77**	**64**	**80**
Sec-Butylbenzene	<0.5 U	<0.5 U	<12 U	<50 U
Styrene	<0.5 U	<0.5 U	<12 U	<50 U
Tert-Butyl Methyl Ether (MTBE)	**15.1**	**20.1**	7.7 J	6.3 J
Toluene	**101**	**113**	**98**	**170**
Total Xylenes	**177**	**199**	**180**	**230**
SVOCs				
1,2-Dichlorobenzene	NA	NA	<2 U	<10 U
1,2-Diphenylhydrazine	<5 U	<5 UJ	NA	NA
1,4-Dichlorobenzene	NA	NA	<2 U	<10 U
1,4-Dioxane (P-Dioxane)	NA	NA	**6.87**	**16.1**
2,4-Dichlorophenol	<5 U	<5 UJ	<5 U	<25 U
2,4-Dimethylphenol	**39 J**	**19 J**	**22**	**47**
2,4-Dinitrotoluene	<5 U	<5 UJ	<5 U	<25 U
3,3'-Dichlorobenzidine	<5 U	**10.4 J**	<5 U	<25 U
Acenaphthene	<2.5 U	<2.5 UJ	<0.1 U	**1.1**
Benzo(a)anthracene	<2.5 U	<2.5 U	**0.59**	**1.8**
Benzo(a)pyrene	<2.5 U	<2.5 U	<0.1 U	**0.84 J**
Benzo(b)fluoranthene	<2.5 U	<2.5 U	<0.1 U	**1.1**
Benzo(k)fluoranthene	<2.5 U	<2.5 U	<0.1 U	<1 U
Biphenyl (Diphenyl)	<5 U	<5 UJ	<2 U	<10 U
Bis(2-ethylhexyl) phthalate	<25 U	<3 U	<3 U	<15 U
Chrysene	<2.5 U	<2.5 U	**0.23**	**0.95 J**
Diethyl phthalate	<5 U	<5 UJ	6	<25 U
Hexachlorobutadiene	<25 U	<25 U	<0.5 U	<5 U
Indeno(1,2,3-cd)pyrene	<2.5 U	<2.5 U	<0.1 U	**0.62 J**
Naphthalene	**11.5 J**	8 J	**18**	**14**
Pentachlorophenol	<12.5 U	<12.5 U	0.68 J	<8 U
Phenol	<5 U	**18 J**	**22**	**94**

Location	J-MW117	J-MW117	J-MW117	J-MW117	J-MW117	J-MW117	J-MW117	J-MW117	J-MW117
Sample Name	J-MW117_062623	J-MW117_112923	J-MW117_122823	J-MW117_040824	J-MW117_071524	J-MW117_011625	J-MW117_042125	J-MW117_072325	J-MW117_102125
Sample Date	06/26/2023	11/29/2023	12/27/2023	04/08/2024	07/15/2024	01/16/2025	04/21/2025	07/23/2025	10/21/2025
VOCs									
1,2,4,5-Tetramethylbenzene	NA	**11**	NA	NA	NA	NA	<40 U	**8.1 J**	**6.4**
1,2,4-Trimethylbenzene	**36.3**	**54**	**35**	**38.1**	**29.4**	**28.7**	**26 J**	**46 J**	**33**
1,2-Dichlorobenzene	0.42 J	<2.5 U	0.38 J	0.37 J	0.44 J	0.37 J	<50 U	<2.5 UJ	<2.5 U
1,2-Dichloroethane	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<10 U	<0.5 UJ	<0.5 U
1,2-Dichloropropane	<0.5 U	<1 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<20 U	<1 UJ	<1 U
1,3,5-Trimethylbenzene (Mesitylene)	**8.33**	**12**	**7.3**	**8.19**	**6.87**	**5.92**	<50 U	**9.7 J**	**7.2**
1,4-Dichlorobenzene	0.65	0.98 J	0.73	0.73	0.92	0.75	<50 U	0.84 J	<2.5 U
Acetone	13.9 J	4.2 J	21.5	8.5 J	14.3	<8.13 U	30 J	19 J	27
Benzene	**73.6**	**72**	**66.8**	**43.7**	**61.9**	**471**	**53**	**53 J**	**49**
Bromomethane	<0.5 U	<2.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<50 U	<2.5 UJ	<2.5 U
Chlorobenzene	<0.5 U	<2.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<50 U	<2.5 UJ	<2.5 U
Chloroethane	<0.5 U	<2.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<50 U	<2.5 UJ	<2.5 U
Chloromethane	<0.5 U	<2.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<50 U	<2.5 UJ	<2.5 U
Cymene	NA	4.6	NA	NA	2.16	<0.5 U	<50 U	2.8 J	2.4 J
Ethylbenzene	**21.3**	**24**	**18.2**	**19.2**	**14.5**	**14.1**	**14 J**	**19 J**	**16**
Hexachlorobutadiene	<0.5 U	<2.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<50 U	<2.5 UJ	<2.5 U
Isopropylbenzene (Cumene)	**11.2**	**12**	**8.53**	**8.99**	**11.3**	**8.81**	<50 U	**9.3 J**	**7.3**
M,P-Xylene	**48.9**	**57**	**38.1**	**41**	**28.7**	**28.1**	**26 J**	**34 J**	**36**
Methyl Ethyl Ketone (2-Butanone)	2.72	<5 U	2.44	<0.5 U	<0.5 U	<0.5 U	<100 U	1.9 J	<5 U
Methylene Chloride	<2 U	<2.5 U	<2 U	<2 U	<2 U	<2 U	<50 U	<2.5 UJ	<2.5 U
n-Butylbenzene	3.08	2.7	3.11	2.57 J	3.46	3	<50 U	1.8 J	1.4 J
n-Propylbenzene	**28.6**	**25**	**16.5**	**18.7**	**25.6**	**17.1**	**17 J**	**19 J**	**14**
o-Xylene (1,2-Dimethylbenzene)	**27.6**	**33**	**21.9**	**22.9**	**18.4**	**19.4**	**16 J**	**21 J**	**22**
Sec-Butylbenzene	1.83	1.7 J	1.17	1.38	1.75	1.23	<50 U	1.3 J	1.1 J
Styrene	<0.5 U	0.76 J	<0.5 U	<0.5 U	1.05	<0.5 U	<50 U	<2.5 UJ	<2.5 U
Tert-Butyl Methyl Ether (MTBE)	**135**	**160**	**122**	**115**	**93**	**95.8**	**85**	**87 J**	**100**
Toluene	**12.8**	**8.7**	**5.27**	3.95	3.43	1.85	<50 U	2.1 J	2.1 J
Total Xylenes	**76.5**	**90**	**60**	**63.8**	**411**	**474**	**42 J**	**55 J**	**58**
SVOCs									
1,2-Dichlorobenzene	NA	NA	<2 U	NA	NA	NA	<2 U	<2 U	<2 U
1,2-Diphenylhydrazine	<6.67 U	NA	<50 U	<25 U	<5.26 U	<5 U	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	<2 U	NA	NA	NA	<2 U	<2 U	<2 U
1,4-Dioxane (P-Dioxane)	**5.07**	**3.91**	**5.17**	**8.06**	**5.79**	**6.46**	**9.89**	**9.24**	**11**
2,4-Dichlorophenol	<6.67 U	<5 U	<50 U	<25 U	<5.26 U	<5 U	<5 U	<5 U	<5 U
2,4-Dimethylphenol	<6.67 U	**44**	**52.1 D**	<25 U	**23.9**	<5 U	**28**	**44**	**39**
2,4-Dinitrotoluene	<6.67 U	<5 U	<50 U	<25 U	<5.26 U	<5 U	<5 U	<5 U	<5 U
3,3'-Dichlorobenzidine	<6.67 U	<5 U	<50 U	<25 U	<5.26 U	<5 U	<5 U	<5 U	<5 U
Acenaphthene	0.333 D	1	0.14	<5 U	<0.0526 U	<0.25 U	0.6	1	<0.1 U
Benzo(a)anthracene	<0.333 U	<0.2 U	<0.05 U	<5 U	<0.0526 U	<0.25 U	<0.1 U	<0.1 U	<0.1 U
Benzo(a)pyrene	<0.333 U	<0.2 U	<0.05 U	<5 U	<0.0526 U	<0.25 U	<0.1 U	<0.1 U	**0.53**
Benzo(b)fluoranthene	<0.333 U	<0.2 U	<0.05 U	<5 U	<0.0526 U	<0.25 U	<0.1 U	<0.1 U	**0.6**
Benzo(k)fluoranthene	<0.333 U	<0.2 U	<0.05 U	<5 U	<0.0526 U	<0.25 U	<0.1 U	<0.1 U	**0.23**
Biphenyl (Diphenyl)	<6.67 U	<2 U	<50 U	<25 U	<5.26 U	<5 U	<2 U	<2 U	<2 U
Bis(2-ethylhexyl) phthalate	**15.9 J**	<3 U	<50 U	<25 U	<0.526 U	<2.5 U	<3 U	<3 U	**15**
Chrysene	<0.333 U	<0.2 U	<0.05 U	<5 U	<0.0526 U	<0.25 U	<0.1 U	<0.1 U	**0.61**
Diethyl phthalate



Legend

- Approximate L-Parcel Site Boundary
- Post-Excavation In-Situ Treatment with PetroFix™ via Direct Mixing (Previously Completed)
- Oxygen Release Compound (ORC) Advanced® Treatment Area via Direct Mixing (Previously Completed)
- Proposed In-situ Groundwater Treatment Extents
- IP001 Proposed Temporary Injection Point
- Approximate Location of Existing Monitoring Well



Notes:

1. Imagery provided through Langan's subscription to Nearmap.com. Flown on 07/03/2025.
2. Tax parcel data provided by the New York City Department of City Planning, MapPLUTO 23v2, and a survey prepared by Langan, July 28, 2023.
3. The assumed radius of influence for each temporary injection point is 6-feet. The location of the injection points are subject to change based on observed field conditions.
4. Each temporary injection point will be advanced to target a 10-foot vertical treatment interval between 6 and 16 feet below surface grade via direct push drilling methods or other approved alternate across a 36,700 square feet in-situ groundwater treatment area.
5. The remedial technology chosen is in-situ chemical oxidation using alkali activated persulfate. The reagent is a combination of (Klozur® SP) and (Klozur® KP), products of Evonik Active Oxygens, LLC, activated using hydrated lime.
6. The remedial reagents will be delivered to the subsurface via the proposed temporary injection points.

30 0 30
SCALE IN FEET

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Project
WILLETS POINT DEVELOPMENT L-PARCEL
BCP SITE NO. C241146H
QUEENS NEW YORK

Figure Title
PROPOSED INJECTION PLAN

Project No. 170197605	Figure No. 3
Date 4/24/2026	
Scale 1"=30'	
Drawn By MG	

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Path: \\langan.com\data\NYC\data6\170197601\ArcGIS\APRX\170197601_SMP_FER\170197601_SMP_FER_SiteH.aprx Date: 4/24/2026 User: Gsajbel Time: 8:37 AM

TABLES

Table 1
Remedial Design Document
Reagent Volume

Willets Point Development L-Parcel
Queens, New York
NYSDEC BCP Site No.: C241146H
Langan Project No.: 170197605

Treatment Zone Characteristics	Units	Values
Treatment area	sq feet	36,700
Top of the treatment zone	feet bgs	6
Bottom of the treatment zone	feet bgs	16
Treatment thickness	feet	10
Treatment volume	cu feet	367,000
Assumed soil density	lb/cu feet	90
Treatment soil mass	lb	33,030,000
Assumed soil porosity	fraction	0.4
Plume volume	gallon	1,098,064
Reagents Volume		
Total persulfate demand	g/Kg	13
Potassium persulfate demand (Klozur® KP)	lb	469,452
Sodium persulfate demand (Klozur® SP)	lb	123,424
Total persulfate concentration in Groundwater	g/L	47
Hydrated lime demand for buffering capacity (92% purity)	lb	4,157
Hydrated lime demand to counter the acid production of Klozur® reagents	lb	182,718
Total hydrated lime demand	lb	186,875
Total reagent weight	lb	779,751
Slurry concentration	%	50
Water for persulfate slurry	lb	532,903
Water for persulfate slurry	gallon	63,897
Density of persulfate slurry	lb/gallon	13
Injection Volume		
Total injection volume	gallon	102,271
Radius of influence (ROI)	feet	6
Injection points	Nos.	371
Spacing between injection points	feet	10
Total volume per injection point	gallon	276
Total number of injection events	Nos.	1
Injection volume per vertical foot	gallon	28

Notes:
sq feet - square feet
bgs - below ground surface
lb - pound
cu - cubic
lb/cu feet - pounds per cubic feet
g/kg - gram per kilogram
lb/lb - pound per pound
g/L - grams per liter
Nos. - number
% - percentage
Klozur® KP, 'Klozur® SP, and hydrated lime are products of Evonik Active Oxygen, LLC, Philadelphia, PA.
Klozur® KP and SP dose in lb is provided by the vendor Evonik Active Oxygen, LLC, Philadelphia, PA.
The persulfate slurry is prepared by mixing hydrant water with Klozur® KP, 'Klozur® SP, and hydrated lime.
Alkali demand is a combination of stoichiometric demand for neutralization of acid generated by persulfate and alkali needed to raise the treatment zone pH to >10.5 standard units, necessary for persulfate activation.
Approximately 50 to 100 gallons of chase water will be injected at each temporary injection point to flush the reagents.

Table 2
Remedial Design Document
Injection Monitoring Plan

Willets Point Development L-Parcel
Queens, New York
NYSDEC BCP Site No.: C241146H
Langan Project No.: 170197605

Description	Location	Matrix	Parameters	Frequency	Monitoring Instruments/Method
Groundwater Monitoring	Monitoring Wells[a]	Groundwater	Groundwater elevation	Daily before injections	Water level meter
			Field parameters[b]	Once every two days	Horiba U-52 or YSI meter
Field Monitoring	Area within and around the treatment zone	Field	Surfacing/Leaks	Every 30 - 60 mins during injections	Visual Inspection
Process Monitoring	Injection System including Skid, Distribution Manifold and Injection Heads	Injection Mix	Flow rate, volume injected and injection pressure	Every 30 - 60 mins	Pressure gauges and totalizers
Batch Monitoring	Mixing Tank	Reagent Slurry	Volume of water and reagent quantities	Every mix batch	Visual Inspection

Notes:

[a] - J-MW117, J-MW118, J-MW201, J-MW202, J-MW203, and J-MW204 will be used to monitor the water quality parameters during the injections.

[b] - Field parameters include dissolved oxygen, oxidation-reduction potential, persulfate, conductivity, pH, temperature, turbidity, total dissolved solids. Field parameters will be measured by lowering a water quality meter into the well.

APPENDIX A

Bench-Scale ISCO Treatability Study Report

LANGAN

Technical Memorandum

Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
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To: Queens Development Group, LLC; QDG Hotel Partners, LLC; QDG 126th Street Partners, LLC; QDG Parking Partners, LLC; and, QDG Retail Partners, LLC
From: Gerald Nicholls, P.E., CHMM
Info: Amita Oka, Ph.D., Padmanabhan Krishnaswamy, Elizabeth Burgess, P.E., Ellie Seery
Date: April 24, 2026
Re: Bench-Scale ISCO Treatability Study
Willets Point Development L-Parcel, Queens, New York
NYSDEC BCP Site No.: C241146H
Langan Project No.: 1705197605

1.0 INTRODUCTION

This technical memorandum summarizes the bench-scale treatability study conducted on behalf of Queens Development Group, LLC; QDG Hotel Partners, LLC; QDG 126th Street Partners, LLC; QDG Parking Partners, LLC; and, QDG Retail Partners, LLC (the Volunteers) for the Willets Point Development L-Parcel Site (Site No. C241146H), herein referred to as "the Site"). A Site Location Map is provided as Figure 1. The treatability study for In-Situ Chemical Oxidation (ISCO) was performed to address petroleum-related volatile organic compound (VOC) and semivolatile organic compound (SVOC) impacts to groundwater and soil at the Site as described in the January 15, 2026, Treatability Study Work Plan. This memo also provides the results of a groundwater delineation investigation conducted concurrently with the treatability study to delineate groundwater contamination to the west of the proposed treatment area and assess whether the western-adjoining buildings are a source of contamination.

The following contaminants of concern (COCs) were detected in Site soil collected during the May 2025 sampling event at concentrations above the Protection of Groundwater Soil Cleanup Objectives (PGW SCOs) and in groundwater collected during the October 2025 sampling event at concentrations above New York State Department of Environmental Conservation (NYSDEC) Technical and Operation Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards and Guidance Values for Class GA Water and published addenda (herein collectively referenced as "NYSDEC SGVs"):

- 1,2,4-Trimethylbenzene
- 1,3,5-Trimethylbenzene
- Acetone
- Benzene
- Ethylbenzene
- n-Propylbenzene
- Tert-butyl methyl ether (MTBE)
- Toluene

- Total xylenes

The objectives of the treatability study were to:

- Evaluate the efficacy of the proposed treatment(s);
- Demonstrate reduction in VOC and SVOC contaminants of COCs in soil and groundwater;
- Identify site-specific dosages of reagents; and
- Develop recommendations for field application.

The bench-scale treatability testing was conducted at Langan's Treatability Study Facility at the New Jersey Institute of Technology (NJIT) in Newark, New Jersey.

2.0 METHODS

This section provides the methodology for field sample (soil and groundwater) collection, baseline sample analysis, titration test, total oxidant demand (TOD) tests, and effectiveness test.

2.1 Field Sample Collection and Baseline Sampling

2.1.1 Groundwater Sample Collection for Treatability

An existing permanent monitoring well, J-MW118, was used to collect bulk groundwater samples to provide aqueous media for use in the treatability study. J-MW118 was installed on May 27, 2025, to 11 feet below ground surface (bgs). The well was constructed with 2-inch-diameter solid polyvinyl chloride (PVC) riser pipe attached to a 10-foot-long, schedule (SCH) 40, 0.01-inch pre-packed well screen set to straddle the observed groundwater table from 1 to 11 feet bgs. J-MW118 is shown on Figure 2. The monitoring well construction log is provided in Attachment A.

The bulk groundwater sample from J-MW118 was collected on January 30, 2026. Approximately 25 liters (L) of groundwater were collected from J-MW118 using low-flow sampling methods and stored in 5 L Labtainer™ bags. The bulk groundwater samples were transported to NJIT and stored at approximately 4° degrees Celsius (°C). Prior to sampling, J-MW118 was gauged for static water levels, headspace photoionization detector (PID) readings, and purged. Physical and chemical parameters (e.g., temperature, dissolved oxygen, oxygen reduction potential [ORP], turbidity) were allowed to stabilize to the ranges specified in the United States Environmental Protection Agency Low Stress Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells, dated July 30, 1996, and revised on January 19, 2010. A groundwater sample was also collected from J-MW118 for analysis of Part 375/target compound list (TCL) VOCs, SVOCs, and total organic carbon (TOC). The samples were sent to York Analytical Laboratories, Inc. (York), a New York State Department of Health Environmental Laboratory Approval Program (ELAP)-certified analytical laboratory, located in Stratford, Connecticut (ELAP ID No. 10854). The analytical data generated from the groundwater samples

served as a baseline for the treatability study. The groundwater sampling log for J-MW118 is provided in Attachment A.

2.1.2 Soil Sampling Collection for Treatability Study

Three soil borings were advanced to collect bulk soil samples for use in the treatability study. Bulk soil samples were biased toward intervals exhibiting the greatest degree of environmental impacts based on visual, and olfactory indications, and PID readings. The soil samples (TS01, TS02, and TS03) were collected at three locations on January 29, 2026. Aquifer Drilling and Testing, Inc. (ADT) advanced one soil boring at each location using a track mounted Fraste XL MAX MRS Sonic drill rig. Soil was collected continuously into 3.75-inch-diameter by 5-foot-long steel Sonic rod. Information on the bulk soil samples collection intervals and previous groundwater treatment is provided below:

Soil Borings/Sample Location	Interval Collected	Previous Treatment Description
TS01	12 to 14 feet bgs (about elevation [el] 3 to 1)	No in situ treatment
TS02	12 to 14 feet bgs (about el 3 to 1)	PetroFix™ and ORC Advanced® were implemented
TS03	9 to 11 feet bgs (about el 6 to 4)	PetroFix™ was implemented

Gravel and/or cobbles measuring greater than 0.5 inches in diameter and anthropogenic material (i.e., concrete, brick, etc.) were removed from the bulk soil samples. The bulk soil samples collected from each location were separately homogenized in labeled Ziploc® bags. After soil homogenization, soil samples were collected and transported to York for analysis for Part 375/TCL VOCs, SVOCs, and TOC. The analytical data generated from the soil samples served as a baseline for the treatability study. The remainder of the bulk soil samples were secured in coolers and transported to NJIT and stored at approximately 4°C. The soil boring logs are included in Attachment B, and the soil boring locations are shown in Figure 2.

2.1.3 Groundwater Delineation

Four temporary groundwater wells were installed to delineate groundwater contamination to the west of the proposed treatment area and assess whether the western-adjoining buildings are a source of contamination. ADT advanced four soil borings to between 15 and 20 feet bgs on the western part of the Site using a Fraste XL MAX MRS Sonic drill rig on January 28, 2026. Soil borings were converted into temporary groundwater monitoring wells (TMW01 through TMW04). The 2-inch monitoring wells were constructed using a 10-foot-long, SCH 40 PVC 0.010-inch pre-packed well screen, connected to a solid PVC riser pipe to surface grade. The screens

were placed across the groundwater table; the bottom of the well screens were installed between 15 and 18 feet bgs.

Five groundwater samples (including one quality assurance/quality control [QA/QC] duplicate sample) were collected for laboratory analysis on January 29, 2026 from temporary monitoring wells TMW01 through TMW04. Wells were purged while water levels were measured to the nearest 0.01 foot with a Solinst water level meter and groundwater quality parameters (pH, conductivity, turbidity, dissolved oxygen, temperature, and ORP) were monitored with a Horiba U-52 water quality meter. Once groundwater parameters stabilized, a groundwater analytical sample was collected. TMW01 was sampled after purging more than three well volumes without stabilization after one hour of purging. Samples were stored at 4°C and sent to York for analysis. Groundwater water samples were analyzed for Part 375/TCL VOCs. The well construction and groundwater sampling logs are provided in Attachment A.

2.2 Titration

2.2.1 Base Titration

A base titration test was performed on February 2, 2026 to determine the alkali demand of the bulk groundwater and soil samples collected from each location. Titrations were performed with 10 Normal (N) sodium hydroxide (NaOH) solution to reach a pH >10.5 standard units (S.U.), which is essential for the activation of persulfate. The safety data sheet (SDS) for NaOH is provided in Attachment C.

2.2.2 Acid Titration

An acid titration test was performed on February 27, 2026 to determine the acid demand of the bulk groundwater and soil samples collected from each location. Titrations were performed using a >99% assay acetic acid solution and a >85% assay lactic acid solution to adjust the alkaline of the Site groundwater to a neutral pH of 7 S.U. since pH conditioning will be required to maintain effective biodegradation of the COCs. The SDS for acetic and lactic acids are provided in Attachment C.

2.3 TOD Test Setup

The total oxidant demand (TOD) tests were set up in duplicates to determine the range of oxidant dosage that would be needed to set up the effectiveness test. The TOD tests for each of the three soil sample locations were set up on February 2, 2026 using bulk groundwater, homogenized soil, sodium persulfate reagent Klozur® SP (a product of Evonik Active Oxygens, LLC in Philadelphia, PA), and an alkali reagent, 10N NaOH. The specification and SDS for the reagents used in the treatability study are provided in Attachment C.

For each of the three soil sample locations, three doses of persulfate were tested with a groundwater control to determine the TOD of groundwater in the absence of soil. The following four-ounce jars were set up:

- Duplicate control jars (Control-A and Control-B) containing only groundwater, 10N NaOH solution, and 10 grams per liter (g/L) Klozur® SP in total volume;
- Duplicate low dose jars (Low Dose-A and Low Dose-B) containing groundwater, soil, 10N NaOH solution, and 10 g/L Klozur® SP in total volume;
- Duplicate medium dose jars (Medium Dose-A and Medium Dose-B) containing groundwater, soil, 10N NaOH solution, and 15 g/L Klozur® SP in total volume; and
- Duplicate high dose jars (High Dose-A and High Dose-B) containing groundwater, soil, 10N NaOH solution, and 25 g/L Klozur® SP in total volume.

On February 6, 2026 and February 12, 2026, 4- and 10-days post-setup respectively, the TOD test jars were sampled to evaluate water quality parameters and residual persulfate levels. Aqueous phase samples from the TOD test jars were monitored for pH and ORP and analyzed for residual persulfate concentration using a spectrophotometric method. The TOD analyses were performed at Langan's treatability facility at NJIT. The sampling conducted at day 4 post setup was to confirm that residual persulfate levels are maintained in the TOD jars. A summary of the TOD test setup is provided in Table 1.

2.4 Effectiveness Test Setup

The effectiveness test was set up to determine the effectiveness of ISCO treatment in decreasing VOC and SVOC concentrations in soil and groundwater. The effectiveness test jars were set up on February 17, 2026, using Site groundwater, homogenized soil from boring location TS01, sodium persulfate reagent Klozur® SP, and NaOH pellets in 2 liter (L) clear glass jars. Soil from boring location TS01 was used since it was located outside the previous treatment area. The effectiveness test was setup as follows:

- Controls – three replicate controls with only soil and groundwater; and
- Treatments – three replicate treatments with soil, groundwater, Klozur® SP, and NaOH.

The dosage of Klozur® SP used for the effectiveness test was based on the results of the TOD test which is described in Section 3.3. A summary of the effectiveness test setup is provided in Table 2. An additional jar was prepared and sampled immediately after setup for aqueous-phase VOC analysis to verify that VOC concentrations in the test jars were consistent with the baseline data. Because reduced VOC concentrations were observed, 1 milliliter (mL) of a 1.8-gram-per-liter (g/L) benzene stock solution was added to all control and treatment jars on February 19, 2026, to compensate for VOC losses that likely occurred prior to test setup.

On March 3, 2026, 14 days post-setup, the effectiveness test jars were sampled to evaluate water quality parameters and residual persulfate levels. Aqueous-phase samples from all the effectiveness test jars were monitored for pH and ORP and analyzed for residual persulfate concentration using a spectrophotometric method. Aqueous phase analytical samples were collected from the effectiveness test jars and sampled for VOCs SVOCs, and TOC. Soil phase analytical samples were also collected from the effectiveness test jars and analyzed for VOCs, SVOCs, and TOC at York. The analysis of pH, ORP, and residual persulfate were performed at NJIT.

2.5 Data Validation

Laboratory analysis of groundwater delineation samples was conducted in accordance with USEPA SW-846 methods and analytical data was reported consistent with the NYSDEC Analytical Services Protocol (ASP) Category B deliverable format. Environmental data was reported electronically using the database software application Environmental Quality Information Systems (EQuIS) as part of the NYSDEC's Environmental Management System (EIMS). QA/QC procedures required by the NYSDEC ASP and SW-846 methods, including initial and continuing instrument calibrations, surrogate compound spikes, and analysis of other samples (blanks and laboratory control samples) were followed.

The laboratory provided clean sample containers, which were preserved in accordance with the SW-846 methods. Where there were differences in the SW-946 and NYSDEC ASP requirements, the NYSDEC ASP took precedence.

Data validation was performed in accordance with the USEPA Region 2 Standard Operating Procedures (SOPs) for data validation and USEPA's National Functional Guidelines for Organic and Inorganic Data Review. Validation included the following:

- Verification of QC sample results (both qualitative and quantitative)
- Verification of sample results (both positive hits and non-detects)
- Preparation of Data Usability Summary Report (DUSRs)

Laboratory analytical results from the groundwater delineation sampling event were reported in the ASP Category B deliverable format and were validated by Mr. Joe Conboy of Langan, a qualified data validator, in accordance with the Quality Assurance Project Plan (QAPP) included as Attachment D.

<u>DUSR</u>

A DUSR was prepared for the groundwater samples collected from the temporary wells (TMW01 through TMW04). The DUSR presents the results of data validation, including a summary assessment of laboratory data packages, sample preservation and chain-of-custody procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and

completeness for each analytical method. The following items were assessed for all samples collected during the groundwater delineation study:

- Holding times
- Sample preservation
- Blank results (method, field and trip blanks)
- Surrogate recovery compounds
- Laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) recoveries and relative percent difference (RPD) values
- Laboratory duplicate RPD values
- Field duplicate RPD values

Based on the results of data validation, the following qualifiers were assigned to the data in accordance with the USEPA's guidelines and best professional judgment:

- "U" – The analyte was analyzed for, but was not detected at a level greater than or equal to the reporting limit (RL), or the sample concentration results were impacted by blank contamination.
- "UJ" – The analyte was not detected at a level greater than or equal to the RL; however the reported RL is approximate and may be inaccurate or imprecise.
- "J" – The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample.

No major deficiencies were identified for this data set and data was judged to be 100% valid, as qualified. After data validation was complete, validated data were used to prepare the tables and figures included in this report. A copy of the DUSR is included as Attachment E.

3.0 RESULTS

The results of the baseline groundwater and soil samples, titration test, TOD test, effectiveness test, and groundwater delineation are provided in the following sections.

3.1 Baseline Groundwater and Soil Samples Analytical Data

The baseline groundwater samples collected from J-MW118 and soil analytical samples collected from TS01_EL_4-6, TS02_EL_1-3, and TS03_EL_1-3 are described below and the analytical results of the baseline groundwater and soil samples are summarized in Attachment F. The laboratory analytical reports are provided in Attachment G.

Twelve VOCs were detected at concentrations above the NYSDEC SGVs in J-MW118, as summarized below.

Analyte	NYSDEC SGVs	Unit	Detected Concentration above SGVs
VOCs			**J-MW118_013026**
1,2,4-Trimethylbenzene	5	ug/l	221 D
1,2-Dichlorobenzene	3	ug/l	3.6
1,3,5-Trimethylbenzene (Mesitylene)	5	ug/l	76.7
Benzene	1	ug/l	98.5 D
Ethylbenzene	5	ug/l	154 D
Isopropylbenzene (Cumene)	5	ug/l	14.6
M,P-Xylene	5	ug/l	599 D
n-Propylbenzene	5	ug/l	31.7
o-Xylene (1,2-Dimethylbenzene)	5	ug/l	296 D
Tert-Butyl Methyl Ether (MTBE)	10	ug/l	478 D
Toluene	5	ug/l	370 D
Total Xylenes	5	ug/l	895 D

At least ten VOCs were detected at concentrations above the PGW SCOs in soil samples collected as summarized in the table below.

Analyte	PGW SCOs	Unit	Minimum Detected Concentration above SCOs		Maximum Detected Concentration above SCOs	
1,2,4-Trimethylbenzene	5.9	mg/kg	35	TS02_EL_1-3	360	TS01_EL_4-6
1,3,5-Trimethylbenzene (Mesitylene)	3.1	mg/kg	13	TS02_EL_1-3	80	TS01_EL_4-6
Acetone	0.03	mg/kg	0.13	TS03_EL_1-3	0.32	TS02_EL_1-3
Benzene	0.06	mg/kg	0.1	TS02_EL_1-3	8.2	TS01_EL_4-6
Ethylbenzene	1	mg/kg	9	TS02_EL_1-3	36	TS03_EL_1-3
n-Butylbenzene	18	mg/kg	25	TS01_EL_4-6	25	TS01_EL_4-6
n-Propylbenzene	5	mg/kg	33	TS01_EL_4-6	33	TS01_EL_4-6
Tert-Butyl Methyl Ether (MTBE)	0.1	mg/kg	2.6	TS01_EL_4-6	2.6	TS01_EL_4-6
Toluene	0.7	mg/kg	9.5	TS02_EL_1-3	75	TS03_EL_1-3
Total Xylenes	1.2	mg/kg	46	TS02_EL_1-3	240	TS03_EL_1-3

3.2 Titration Results

3.2.1 Base Titration

Titration tests were performed to determine the dosage of alkali reagent (10N NaOH) required to increase the pH of homogenized soil and groundwater to greater than 10.5 S.U. for the alkaline activation of persulfate. Based on the titration data, the following alkali dosage (10N NaOH) was required to raise the pH of groundwater and soil to greater than 10.5 S.U. for each of the sample locations:

Sample Location	10N NaOH per Liter of Groundwater (mL)	10N NaOH per Kilogram of Soil (mL)
TS-01	1.0	0.0

Sample Location	10N NaOH per Liter of Groundwater (mL)	10N NaOH per Kilogram of Soil (mL)
TS-02		0.0
TS-03		0.8

3.2.2 Acid Titration

Titration tests were performed to determine the acid demand of groundwater and soil collected from each location. Titrations were performed using a >99% assay acetic acid solution and a >85% assay lactic acid solution to adjust the alkaline Site groundwater to a neutral pH of 7 S.U., should pH conditioning be required to maintain effective biodegradation of the COCs. Based on the titration data, the following acetic acid and lactic dosage was required to lower the pH of groundwater and soil to 7 S.U. for each of the sample locations:

Acetic acid titration data:

Sample Location	Acetic Acid Dosage per Liter of Groundwater (mL)	Acetic Acid Dosage per Kilogram of Soil (mL)
TS-01	0.2	7.2
TS-02		13.4
TS-03		5.8

Lactic acid titration data:

Sample Location	Lactic Acid Dosage per Liter of Groundwater (mL)	Lactic Acid Dosage per Kilogram of Soil (mL)
TS-01	0.5	16.5
TS-02		41.5
TS-03		7.6

The titration data of the groundwater and soil for the three locations are provided in Attachment H.

3.3 TOD Test Results

At the end of the tenth day post-setup, the TOD test jars were sampled to evaluate water quality parameters and residual persulfate levels. Aqueous phase samples from all the TOD test jars for the sample locations were monitored for pH and ORP and analyzed for residual persulfate concentration. The pH and ORP measurements were taken to assess if alkaline pH and high ORP (typically several hundred millivolts) resulting from persulfate-driven oxidation were sustained during the test period. The pH and ORP measurements as well as the sodium persulfate demand calculations are summarized in Table 3 and described below.

- pH: An average pH of greater than 10.5 S.U. was maintained in all the TOD test jars except for the low dose (10.1 S.U.) and medium dose (10.3 S.U.) jars for sample location TS-01. However, these values are still close to the favorable pH of greater than 10.5 S.U.
- ORP: An average ORP between 125 to 200 milli volts (mV) was observed in the low, medium and high dose TOD jars. The positive ORP in all the jars indicates that an oxidative environment was maintained throughout the 10-day reaction period of the TOD test jars.
- Persulfate Demand: Based on the residual persulfate analysis from the TOD test jars, the following TOD (based on sodium persulfate reagent Klozur® SP as oxidant) for groundwater and soil from each of the three sample locations were calculated.

Sample Location	Persulfate Dose	Average Sodium Persulfate Demand by Soil (g/kg)	Average Sodium Persulfate Demand by Groundwater (g/L)
TS-01	Low Dose	13.5	1.0
	Medium Dose	17.2	
	High Dose	26.7	
TS-02	Low Dose	12.2	
	Medium Dose	17.6	
	High Dose	26.9	
TS-03	Low Dose	10.9	
	Medium Dose	14.7	
	High Dose	25.3	

Based on calculated average sodium persulfate demand, the TOD ranges from about 14 to 27 grams per kilogram (g/kg) for TS-01, 13 to 27 g/kg for TS-02, and 11 to 26 g/kg for TS-03. The average sodium persulfate demand for the groundwater from J-MW118 was 1 g/L. Based on TOD data, a minimum of 27 g/kg of sodium persulfate was targeted for the effectiveness test as a conservative oxidant dose that is high enough to confirm effective contaminant destruction, while still maintaining residual persulfate. A safety factor of 1.7 was applied to the selected dosage to account for excess water to soil ratio used in the test jars (to facilitate collection of analytical samples), as compared to that in the field. This resulted in a final sodium persulfate dosage of approximately 45 g/kg (equivalent to 4.5% by weight of soil).

3.4 Effectiveness Test Results

At the end of the 14 day post-setup, aqueous-phase samples from all the effectiveness test jars were monitored for pH, ORP, residual persulfate concentration, and sampled for analysis of VOCs, SVOCs, and TOC. Soil samples were also sampled from the effectiveness test jars and analyzed for VOCs, SVOCs, and TOC. The pH and ORP measurements were collected to assess

if alkaline pH and high ORP (typically several hundred millivolts) resulting from persulfate-driven oxidation were sustained during the test period. The pH, ORP, and residual persulfate measurements are summarized in Table 4. The aqueous phase and soil analytical results are summarized in Tables 5 and 6, respectively, and the analytical laboratory reports are provided in Attachment G. The laboratory report of the sample collected prior to spiking the test jars with benzene (as described in section 2.4) is also provided in Attachment G.

The observations from the effectiveness test are described below:

- pH: An average pH of 10.7 S.U. was measured in the control jars and an average pH of 12.4 S.U. was maintained in the treatment jars, which is favorable for the activation of sodium persulfate.
- ORP: An ORP between 17 to -90 mV was measured in the control jars and an ORP of 130 to 170 mV was measured in the treatment jars containing oxidant. Positive ORP levels in the treatment jars are indicative of oxidative conditions typical of oxidant application.
- Sodium Persulfate: Based on the residual persulfate analysis from the effectiveness test jars, the average sodium persulfate consumption was 30 g/kg of soil.
- VOCs and SVOCs: The following observations were made for the aqueous phase and soil analytical samples collected from the treatment jars:
    - As outlined in the Treatability Study Work Plan, review of the May 2025 soil analytical results and the October 2025 groundwater analytical results identified nine COCs exceeding the PGW SCOs in soil and the NYSDEC SGVs in groundwater, prompting the need for additional groundwater treatment. The effectiveness test showed substantial reductions in the concentrations of these COCs in both the aqueous and soil phases of the treatment jars relative to the control jars, with the exception of acetone, a common byproduct generated during the oxidation of petroleum-related hydrocarbon, which is expected to decrease with increased oxidant contact time. The COCs and corresponding average percent reductions (as compared to the control) for each phase are summarized below:

Contaminant	Average Percent Reduction in Concentration	
	Aqueous Phase	Soil Phase
1,2,4-Trimethylbenzene	92%	98%
1,3,5-Trimethylbenzene	93%	42%
Acetone	-96%	-166%
Benzene	96%	47%
Ethylbenzene	94%	48%
n-Propylbenzene	85%	57%
Tert-Butyl Methyl Ether (MTBE)	94%	72%
Toluene	94%	41%
Total xylenes	94%	39%

- In addition to the COCs previously noted, VOCs, including isopropylbenzene, methylene chloride, and styrene were also detected in the aqueous phase of the test jars at concentrations exceeding the NYSDEC SGVs. These compounds showed average reduction of 60%, 42%, and 89%, respectively, in the treatment jars when compared to the controls. No other VOCs were detected in the soil phase of the test jars at concentrations exceeding the NYSDEC SGVs.
- Nine SVOCs were detected in the aqueous phase of the test jars at concentrations exceeding the NYSDEC SGVs. Among these compounds, naphthalene and benzo(a)pyrene showed average reduction of 67% and 23%, respectively, in the treatment jars when compared to the controls. Concentrations of 2-methylphenol and phenol declined to non-detectable levels in the treatment jars when compared to the controls. The remaining SVOCs exceeding the NYSDEC SGVs, primarily polycyclic aromatic hydrocarbons (PAHs), were detected at relatively low concentrations and showed either no significant reduction or a slight increase in concentration compared to the controls. The slight increase in aqueous phase PAHs could be attributed to desorption from soil mass.
- Five PAHs, were detected in the soil phase of the test jars at concentrations exceeding the PGW SCOs. The PAH soil concentrations showed either no significant reduction or an increase in concentration compared to the controls. Notably, the soil concentration of naphthalene increased by approximately an order of magnitude while the remaining four PAHs only increased marginally in the treatment jar compared to the controls. Increase in soil naphthalene concentrations is likely an artifact of analytical laboratory extraction and analysis process, specifically when samples have high pH (alkali was used in treatment) and TOC (baseline soil sample TOC was 47,200 mg/kg). The documented reduction in aqueous phase naphthalene concentration further supports that the increased naphthalene in treated soil is potentially associated with analytical laboratory process as opposed to leachable contaminant mass.
- Overall, the effectiveness test demonstrated a reduction in concentration of VOCs at 14 days. SVOCs in general require longer treatment time and are expected to decrease in concentration further with the presence of residual persulfate.

3.5 Groundwater Delineation Analytical Results

Groundwater analytical results were compared to NYSDEC SGVs. Fourteen VOCs were detected in one or more groundwater samples at concentrations above the NYSDEC SGVs in temporary monitoring wells TMW01, TMW02, TMW03, and TMW04. The following table provides the maximum concentration of VOCs that were detected above the NYSDEC SGVs.

Analyte	NYSDEC SGVs	Unit	Minimum Detected Concentration above SGVs		Maximum Detected Concentration above SGVs	
VOCs						
1,2,4-Trimethylbenzene	5	ug/l	11.4	TMW02_012926	61.7	TMW04_012926
1,3,5-Trimethylbenzene (Mesitylene)	5	ug/l	6.58	GWDUP01_012926	21.4	TMW04_012926
Acetone	50	ug/l	52.4	TMW04_012926	52.4	TMW04_012926
Acrylonitrile	5	ug/l	8.64	TMW02_012926	9.8	GWDUP01_012926
Benzene	1	ug/l	6.21	TMW02_012926	45.9	TMW04_012926
Dichlorodifluoromethane	5	ug/l	6.69	TMW02_012926	6.69	TMW02_012926
Ethylbenzene	5	ug/l	5.8	TMW02_012926	40.8	TMW04_012926
M,P-Xylene	5	ug/l	18.9	TMW02_012926	92.1	TMW04_012926
n-Propylbenzene	5	ug/l	5.97	TMW04_012926	5.97	TMW04_012926
o-Xylene (1,2-Dimethylbenzene)	5	ug/l	12.2	GWDUP01_012926	62.6	TMW04_012926
Styrene	5	ug/l	6.96	TMW01_012926	23.5	TMW04_012926
Tert-Butyl Methyl Ether (MTBE)	10	ug/l	70.9	TMW02_012926	438	TMW04_012926
Toluene	5	ug/l	16.3	GWDUP01_012926	69.3	TMW04_012926
Total Xylenes	5	ug/l	23	TMW02_012926	155	TMW04_012926

ug/l = micrograms per liter
GWDUP01_012926 was collected from parent sample TMW03_012926

A summary table of the groundwater delineation sample results is provided in Table 7. Groundwater sample locations are shown on Figure 3. Laboratory analytical reports are included in Attachment G.

4.0 CONCLUSIONS AND RECOMMENDATIONS

The bench scale ISCO treatability study evaluated persulfate treatment of VOCs and SVOCs for groundwater and soil remediation at the Site. Based on results of the effectiveness test, the positive ORP and decrease in aqueous phase VOC concentrations in the treatment jars when compared to the control jars is a favorable outcome. Residual persulfate measured in the treatment jars at the conclusion of the effectiveness test demonstrates presence of residual oxidant and potential for continued treatment. While aqueous phase VOC and SVOC concentrations decreased under the tested conditions, the presence of residual contaminants and unreacted persulfate suggests that a longer reaction time may be necessary to achieve further reduction in contaminant mass in groundwater and soil. The increase in soil phase SVOC concentration could be an artifact of analysis of soils with high TOC and alkaline pH. However, during field application, the groundwater and soil pH are expected to return to baseline conditions after the ISCO reactions are complete.

A second application of alkaline-activated persulfate may also be necessary to address any residual dissolved-phase VOC and SVOC mass following the initial treatment. After completion of ISCO application, groundwater conditioning may be required using either lactic or acetic acid to neutralize the generally alkaline Site groundwater (baseline groundwater pH was 9.7) to promote microbial degradation of the residual contaminants via sulfate reduction.

Overall, ISCO treatment was found to be effective in decreasing groundwater VOC and SVOC concentrations. Therefore, ISCO treatment using alkaline activated persulfate is recommended as a remedy. Based on the results of the treatability study, a sodium persulfate dosage up to 3 to 4.5% by weight may be needed. The dosing for field application, as well as the need for a secondary application and groundwater conditioning, will be finalized as a part of the design, considering Site specific factors and injection constraints.

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FIGURES

Figure 1 – Site Location Map
Figure 2 – Treatability Study Sample Location Map
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Table 2 – Effectiveness Test Setup
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Table 4 – Effectiveness Test Monitoring Results
Table 5 – Effectiveness Test Aqueous Phase Analytical Results Summary
Table 6 – Effectiveness Test Soil Analytical Results Summary
Table 7 – Groundwater Delineation Sample Analytical Results

ATTACHMENTS

Attachment A – Monitoring Well Construction and Groundwater Sampling Logs
Attachment B – Soil Boring Logs
Attachment C – Material Specification and Safety Data Sheets
Attachment D – Quality Assurance Project Plan
Attachment E – Data Usability Summary Report
Attachment F – Baseline Groundwater and Soil Analytical Data Summary
Attachment G – Laboratory Analytical Reports
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TABLES

Table 1
Treatability Study Report
TOD Test Setup

Willets Point Development L-Parcel
Queens, New York
NYSDEC BCP No. C241146H
Langan Project No. 170197605

Treatment Jar ID	Groundwater	Soil	Sodium Persulfate Added	Sodium Persulfate Concentration in Groundwater	Total 10 N Sodium Hydroxide Added	Resultant Sodium Persulfate Dose in Soil
	mL	g	g	g/L	mL	g/kg
J-MW118 + TS-01						
Control - A	110	0	1.2	10.5	0.9	-
Control - B	110	0	1.2	10.5	0.9	-
Low Dose - A	80	60	1.2	13.4	1.0	19.3
Low Dose - B	82	60	1.2	13.2	1.0	19.4
Medium Dose - A	81	60	1.7	19.9	1.4	28.9
Medium Dose - B	80	60	1.7	20.1	1.4	28.9
High Dose - A	82	60	2.9	32.9	2.2	48.1
High Dose - B	81	60	2.9	33.4	2.2	48.2
J-MW118 + TS-02						
Control - A	125	0	1.2	9.3	1.0	-
Control - B	125	0	1.2	9.3	1.0	-
Low Dose - A	80	60	1.2	13.4	0.9	19.3
Low Dose - B	80	60	1.2	13.4	0.9	19.2
Medium Dose - A	81	60	1.7	20.0	1.3	28.9
Medium Dose - B	81	60	1.7	19.9	1.3	28.9
High Dose - A	81	60	2.9	33.4	2.2	48.1
High Dose - B	81	60	2.9	33.4	2.2	48.1
J-MW118 + TS-03						
Control - A	110	0	1.2	10.5	0.9	-
Control - B	110	0	1.2	10.5	0.9	-
Low Dose - A	80	60	1.2	13.4	1.1	19.3
Low Dose - B	81	60	1.2	13.4	1.1	19.3
Medium Dose - A	81	60	1.7	20.1	1.5	29.0
Medium Dose - B	81	60	1.7	20.0	1.5	28.9
High Dose - A	80	60	2.9	33.6	2.3	48.2
High Dose - B	81	60	2.9	33.4	2.3	48.2

Notes:
TOD - Total Oxidant Demand
ID - identification
g - gram
mL - milliliter
g/kg - gram per kilogram
g/L - gram per liter
N - normal

LANGAN

Table 2
Treatability Study Report
Effectiveness Test Setup

Willets Point Development L-Parcel
Queens, New York
NYSDEC BCP No. C241146H
Langan Project No.170197605

Treatment Jar ID	Aqueous Phase	Soil	Total Sodium Persulfate Added	Sodium Persulfate Concentration in Aqueous Phase	Total Sodium Hydroxide Added	Resultant Sodium Persulfate Dose in Soil
	mL	g	g	g/L	g	g/kg
TS-01-E1	1864	900	0.00	0.00	0.0	0.0
TS-01-E2	1879	901	0.00	0.00	0.0	0.0
TS-01-E3	1948	901	0.00	0.00	0.0	0.0
TS-01-E4	1942	901	44.7	22.0	15.6	49.6
TS-01-E5	1917	901	44.6	22.2	15.6	49.5
TS-01-E6	1991	900	44.7	21.5	15.6	49.7

Notes:
ID - identification
mL - milliliter
g - gram
g/L - gram per liter
g/kg - gram per kilogram

Table 3
Treatability Study Report
TOD Test Monitoring Results

Willets Point Development L-Parcel
Queens, New York
NYSDEC BCP No. C241146H
Langan Project No.170197605

Treatment Jar ID	Soil	Groundwater	10 N Sodium Hydroxide	Sodium Persulfate	Total Groundwater	Initial Sodium Persulfate Concentration in Groundwater	Persulfate	Initial Persulfate Concentration Groundwater	Residual Persulfate Concentration in Groundwater	Total Persulfate Consumed	Total Persulfate Consumed by Groundwater	Average Total Persulfate Consumed by Groundwater	Total Persulfate Consumed by Groundwater	Total Persulfate Consumed by Wet Soil	Average Persulfate Consumed by Wet Soil	Sodium Persulfate Demand by Groundwater	Sodium Persulfate Demand for Wet Soil	Dose Range	pH	ORP
	g	mL	mL	g	L	g/L	g	g/L	g/L	g	g/L	g/L	g	g/kg	g/kg	g/L	g/kg	g/kg	S.U.	mV
J-MW118 + TS-01																				
Control - A	0	110	0.9	1.2	0.110	10.5	0.9	8.5	7.7	0.1	0.8	0.9	-	-	-	1.1	-	18 to 27	13.1	150
Control - B	0	110	0.9	1.2	0.110	10.5	0.9	8.5	7.5	0.1	0.9		-	-					13.3	135
Low Dose - A	60	80	1.0	1.2	0.086	13.4	0.9	10.8	2.2	0.7	-	-	0.1	11.1	11.0	-	13.7		10.1	133
Low Dose - B	60	82	1.0	1.2	0.088	13.2	0.9	10.7	2.3	0.7	-	-	0.1	11.0		-			10.0	144
Medium Dose - A	60	81	1.4	1.7	0.087	19.9	1.4	16.1	5.3	0.9	-	-	0.1	14.4	14.2	-	17.6		10.3	166
Medium Dose - B	60	80	1.4	1.7	0.086	20.1	1.4	16.2	5.6	0.9	-	-	0.1	14.0		-			10.3	170
High Dose - A	60	82	2.2	2.9	0.088	32.9	2.3	26.6	11.0	1.4	-	-	0.1	21.4	22.1	-	27.4		10.5	190
High Dose - B	60	81	2.2	2.9	0.087	33.4	2.3	26.9	10.3	1.4	-	-	0.1	22.8		-			10.4	200
J-MW118 + TS-02																				
Control - A	0	125	1.0	1.2	0.125	9.3	0.9	7.5	6.8	0.1	0.7	0.7	-	-	-	0.9	-	18 to 27	12.6	110
Control - B	0	125	1.0	1.2	0.125	9.3	0.9	7.5	6.7	0.1	0.8		-	-					12.8	88
Low Dose - A	60	80	0.9	1.2	0.086	13.4	0.9	10.8	3.4	0.6	-	-	0.1	9.7	10.0	-	12.4		12.0	126
Low Dose - B	60	80	0.9	1.2	0.086	13.4	0.9	10.8	2.8	0.7	-	-	0.1	10.4		-			11.9	131
Medium Dose - A	60	81	1.3	1.7	0.087	20.0	1.4	16.1	5.6	0.9	-	-	0.1	14.1	14.5	-	18.0		12.0	144
Medium Dose - B	60	81	1.3	1.7	0.087	19.9	1.4	16.1	5.0	1.0	-	-	0.1	15.0		-			12.1	148
High Dose - A	60	81	2.2	2.9	0.087	33.4	2.3	26.9	11.3	1.4	-	-	0.1	21.5	22.3	-	27.6		12.3	157
High Dose - B	60	81	2.2	2.9	0.087	33.4	2.3	27.0	10.2	1.4	-	-	0.1	23.1		-			12.3	161
J-MW118 + TS-03																				
Control - A	0	110	0.9	1.2	0.110	10.5	0.9	8.5	7.7	0.1	0.8	0.8	-	-	-	1.0	-	15 to 26	12.9	46
Control - B	0	110	0.9	1.2	0.110	10.5	0.9	8.5	7.7	0.1	0.8		-	-					12.9	52
Low Dose - A	60	80	1.1	1.2	0.086	13.4	0.9	10.8	2.6	0.7	-	-	0.1	10.8	9.0	-	11.2		11.7	134
Low Dose - B	60	81	1.1	1.2	0.087	13.4	0.9	10.8	5.0	0.5	-	-	0.1	7.2		-			12.5	130
Medium Dose - A	60	81	1.5	1.7	0.087	20.1	1.4	16.2	6.7	0.8	-	-	0.1	12.6	12.2	-	15.1		12.4	144
Medium Dose - B	60	81	1.5	1.7	0.087	20.0	1.4	16.2	7.2	0.8	-	-	0.1	11.9		-			12.5	143
High Dose - A	60	80	2.3	2.9	0.086	33.6	2.3	27.1	11.5	1.3	-	-	0.1	21.2	21.0	-	26.0		12.2	160
High Dose - B	60	81	2.3	2.9	0.087	33.4	2.3	26.9	11.7	1.3	-	-	0.1	20.8		-			12.3	167

Notes:
TOD - Total Oxidant Demand
ID - identification
g - gram
mL - milliliter
g/kg - gram per kilogram
g/L - gram per liter
S.U. - standard units
mV - milli volts
N - normal
ORP - oxidation reduction potential

Table 4
Treatability Study Report
Effectiveness Test Monitoring Results

Willets Point Development L-Parcel
Queens, New York
NYSDEC BCP No. C241146H
Langan Project No.170197605

Treatment Jar ID	Soil	Groundwater	Sodium Hydroxide	Sodium Persulfate	Total Groundwater	Initial Sodium Persulfate Concentration in Groundwater	Persulfate	Initial Persulfate Concentration in Groundwater	Residual Persulfate Concentration in Groundwater	Total Persulfate Consumed	Total Persulfate Consumed by Groundwater	Total Persulfate Consumed by Groundwater	Total Persulfate Consumed by Wet Soil	Average Persulfate Consumed by Wet Soil	Average Sodium Persulfate Consumed by Wet Soil	pH	ORP
	g	mL	g	g	L	g/L	g	g/L	g/L	g	g/L	g	g/kg	g/kg	g/kg	S.U.	mV
TS-01-E1	900	1864	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	10.9	-80
TS-01-E2	901	1879	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	10.4	-90
TS-01-E3	901	1948	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	10.8	17
TS-01-E4	901	1942	15.6	44.7	2.0	22.0	36.0	17.7	6.1	23.7	0.8	1.6	24.5	24.2	30.0	12.4	175
TS-01-E5	901	1917	15.6	44.6	2.0	22.2	36.0	17.9	6.1	23.7	0.8	1.6	24.6			12.3	130
TS-01-E6	900	1991	15.6	44.7	2.1	21.5	36.1	17.3	6.3	22.9	0.8	1.7	23.6			12.5	150

Notes:
ID - identification
g - gram
mL - milliliter
g/kg - gram per kilogram
g/L - gram per liter
S.U. - standard units
mV - millivolts
ORP - oxidation reduction potential

Table 5
Treatability Study Report
Effectiveness Test Aqueous Phase Analytical Results Summary

Willets Point Development L-Parcel
Queens, New York
NYSDEC BCP Site No.: C241146H
Langan Project No.: 170197605

Analyte	CAS Number	NYSDEC SGVs	Sample Group	CONTROL GROUP	CONTROL GROUP	CONTROL GROUP	TREATMENT GROUP	TREATMENT GROUP	TREATMENT GROUP	Avg. Concentration in Controls	Avg. Concentration in Treatment	Percent Reduction in Concentration
			Location	TS-01-GW-E1	TS-01-GW-E2	TS-01-GW-E3	TS-01-GW-E4	TS-01-GW-E5	TS-01-GW-E6			
			Sample Name	TS-01-GW-E1_030326	TS-01-GW-E2_030326	TS-01-GW-E3_030326	TS-01-GW-E4_030326	TS-01-GW-E5_030326	TS-01-GW-E6_030326			
			Unit	Result	Result	Result	Result	Result	Result	Result	Result	Result
Volatile Organic Compounds												
1,1,1,2-Tetrachloroethane	630-20-6	5	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
1,1,1-Trichloroethane	71-55-6	5	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
1,1,2,2-Tetrachloroethane	79-34-5	5	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	5	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
1,1,2-Trichloroethane	79-00-5	1	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
1,1-Dichloroethane	75-34-3	5	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
1,1-Dichloroethene	75-35-4	5	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
1,2,3-Trichlorobenzene	87-61-6	5	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
1,2,3-Trichloropropane	96-18-4	0.04	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
1,2,4-Trichlorobenzene	120-82-1	5	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
1,2,4-Trimethylbenzene	95-63-6	**5**	ug/l	**225 D**	**215 D**	**186 D**	**18.8 D**	**16.8 D**	**11.8 D**	208.7	15.80	92
1,2-Dibromo-3-Chloropropane	96-12-8	0.04	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	0.0006	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
1,2-Dichlorobenzene	95-50-1	3	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
1,2-Dichloroethane	107-06-2	0.6	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
1,2-Dichloropropane	78-87-5	1	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	**5**	ug/l	**56.3 D**	**54.7 D**	**48.5 D**	4.9 D	3.85 D	3.1 D	53.167	3.950	93
1,3-Dichlorobenzene	541-73-1	3	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
1,4-Dichlorobenzene	106-46-7	3	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
2-Hexanone (MBK)	591-78-6	50	ug/l	<5 U	<5 U	<5 U	<2.5 U	5.3 D	<2.5 U	-	5.3	NA
Acetone	67-64-1	**50**	ug/l	**361 D**	**326 D**	**232 D**	**606 D**	**608 D**	**588 D**	306.33	600.7	-96
Acrolein	107-02-8	5	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	3.85 D	-	3.85	NA
Acrylonitrile	107-13-1	5	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
Benzene	71-43-2	**1**	ug/l	**598 D**	**558 D**	**760 D**	**25.2 D**	**26.4 D**	**23.8 D**	638.67	25.133	96
Bromochloromethane	74-97-5	5	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
Bromodichloromethane	75-27-4	50	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
Bromoform	75-25-2	50	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
Bromomethane	74-83-9	5	ug/l	<20 U	<20 U	<20 U	<10 U	<10 U	<10 U	-	-	NA
Carbon Disulfide	75-15-0	60	ug/l	<5 U	<5 U	<5 U	2.95 D	<2.5 U	<2.5 U	-	2.95	NA
Carbon Tetrachloride	56-23-5	5	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
Chlorobenzene	108-90-7	5	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
Chloroethane	75-00-3	5	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
Chloroform	67-66-3	7	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
Chloromethane	74-87-3	5	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
Cis-1,2-Dichloroethene	156-59-2	5	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
Cis-1,3-Dichloropropene	10061-01-5	0.4	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
Cyclohexane	110-82-7	NS	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
Cymene	99-87-6	5	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
Dibromochloromethane	124-48-1	50	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
Dibromomethane	74-95-3	5	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
Dichlorodifluoromethane	75-71-8	5	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
Ethylbenzene	100-41-4	**5**	ug/l	**31.9 D**	**31.7 D**	**29.2 D**	2.4 JD	1.8 JD	<2.5 U	30.933	1.883	94
Hexachlorobutadiene	87-68-3	0.5	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
Isopropylbenzene (Cumene)	98-82-8	**5**	ug/l	**5.4 D**	**5.3 D**	4.4 JD	<2.5 U	<2.5 U	<2.5 U	5.033	2.02	60
M,P-Xylene	179601-23-1	**5**	ug/l	**141 D**	**141 D**	**131 D**	**11 D**	**9.25 D**	**6.45 D**	137.7	8.90	94
Methyl Acetate	79-20-9	NS	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
Methyl Ethyl Ketone (2-Butanone)	78-93-3	**50**	ug/l	**77.5 D**	**70.9 D**	**56 D**	**72.3 D**	**85.9 D**	**85 D**	68	81.07	-19
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	108-10-1	NS	ug/l	72.5 D	84.2 D	76.3 D	17.2 D	15.9 D	<2.5 U	77.7	11.0	86
Methylcyclohexane	108-87-2	NS	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
Methylene Chloride	75-09-2	**5**	ug/l	**25.1 D**	**13.2 JD**	**12.5 JD**	4.35 JD	**6.7 JD**	**18.6 D**	16.933	9.88	42
n-Butylbenzene	104-51-8	5	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
n-Propylbenzene	103-65-1	**5**	ug/l	**13.6 D**	**13.2 D**	**11.1 D**	<2.5 U	<2.5 U	<2.5 U	12.633	1.920	85
o-Xylene (1,2-Dimethylbenzene)	95-47-6	**5**	ug/l	**122 D**	**117 D**	**110 D**	**9 D**	**7.65 D**	**5.3 D**	116.3	7.317	94
Sec-Butylbenzene	135-98-8	5	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
Styrene	100-42-5	**5**	ug/l	**12.6 D**	**12.8 D**	**10.9 D**	<2.5 U	<2.5 U	<2.5 U	12.10	1.280	89
T-Butylbenzene	98-06-6	5	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
Tert-Butyl Alcohol	75-65-0	NS	ug/l	<10 U	<10 U	<10 U	<5 U	<5 U	<5 U	-	-	NA
Tert-Butyl Methyl Ether (MTBE)	1634-04-4	**10**	ug/l	**365 D**	**387 D**	**403 D**	**24.4 D**	**26.6 D**	**18 D**	385	23.0	94
Tetrachloroethene (PCE)	127-18-4	5	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
Toluene	108-88-3	**5**	ug/l	**95.3 D**	**102 D**	**114 D**	**7.95 D**	**6.1 D**	4.65 D	103.8	6.233	94
Total Xylenes	1330-20-7	**5**	ug/l	**263 D**	**258 D**	**242 D**	**20 D**	**16.9 D**	**11.8 D**	254.3	16.233	94
Trans-1,2-Dichloroethene	156-60-5	5	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
Trans-1,3-Dichloropropene	10061-02-6	0.4	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
Trichloroethene (TCE)	79-01-6	5	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
Trichlorofluoromethane	75-69-4	5	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA
Vinyl Chloride	75-01-4	2	ug/l	<5 U	<5 U	<5 U	<2.5 U	<2.5 U	<2.5 U	-	-	NA

Table 5
Treatability Study Report
Effectiveness Test Aqueous Phase Analytical Results Summary

Willets Point Development L-Parcel
Queens, New York
NYSDEC BCP Site No.: C241146H
Langan Project No.: 170197605

Analyte	CAS Number	NYSDEC SGVs	Sample Group	CONTROL GROUP	CONTROL GROUP	CONTROL GROUP	TREATMENT GROUP	TREATMENT GROUP	TREATMENT GROUP	Avg. Concentration in Controls	Avg. Concentration in Treatment	Percent Reduction in Concentration
			Location	TS-01-GW-E1	TS-01-GW-E2	TS-01-GW-E3	TS-01-GW-E4	TS-01-GW-E5	TS-01-GW-E6			
			Sample Name	TS-01-GW-E1_030326	TS-01-GW-E2_030326	TS-01-GW-E3_030326	TS-01-GW-E4_030326	TS-01-GW-E5_030326	TS-01-GW-E6_030326			
			Unit	Result	Result	Result	Result	Result	Result	Result	Result	Result
Semi-Volatile Organic Compounds												
1,2,4,5-Tetrachlorobenzene	95-94-3	5	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	-	-	NA
1,2-Diphenylhydrazine	122-66-7	0	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	-	-	NA
2,3,4,6-Tetrachlorophenol	58-90-2	NS	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	-	-	NA
2,4,5-Trichlorophenol	95-95-4	NS	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	-	-	NA
2,4,6-Trichlorophenol	88-06-2	NS	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	-	-	NA
2,4-Dichlorophenol	120-83-2	1	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	-	-	NA
2,4-Dimethylphenol	105-67-9	**1**	ug/l	<5 U	**18.9**	**26.3**	<5 U	<5 U	<5 U	15.067	-	NA
2,4-Dinitrophenol	51-28-5	1	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	-	-	NA
2,4-Dinitrotoluene	121-14-2	5	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	-	-	NA
2,6-Dinitrotoluene	606-20-2	5	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	-	-	NA
2-Chloronaphthalene	91-58-7	10	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	-	-	NA
2-Chlorophenol	95-57-8	NS	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	-	-	NA
2-Methylnaphthalene	91-57-6	NS	ug/l	16.8	20.4	26.5	4.98 J	6.81	4.37 J	21.233	5.387	74.6310832
2-Methylphenol (o-Cresol)	95-48-7	NS	ug/l	8.74	8.34	10.6	<5 U	<5 U	<5 U	9.227	-	NA
2-Nitroaniline	88-74-4	5	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	-	-	NA
2-Nitrophenol	88-75-5	NS	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	-	-	NA
3 & 4 Methylphenol (m&p Cresol)	65794-96-9	NS	ug/l	37.4	36.9	36.4	<5 U	<5 U	<5 U	36.9	-	NA
3,3'-Dichlorobenzidine	91-94-1	5	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	-	-	NA
3-Nitroaniline	99-09-2	5	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	-	-	NA
4,6-Dinitro-2-Methylphenol	534-52-1	NS	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	-	-	NA
4-Bromophenyl Phenyl Ether	101-55-3	NS	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	-	-	NA
4-Chloro-3-Methylphenol	59-50-7	NS	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	-	-	NA
4-Chloroaniline	106-47-8	**5**	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	**6.92**	-	6.920	NA
4-Chlorophenyl Phenyl Ether	7005-72-3	NS	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	-	-	NA
4-Nitroaniline	100-01-6	5	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	-	-	NA
4-Nitrophenol	100-02-7	NS	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	-	-	NA
Acenaphthene	83-32-9	20	ug/l	4	4.76	3.51	0.876	0.86	0.562	4.090	0.766	81
Acenaphthylene	208-96-8	NS	ug/l	0.29	0.303	0.486	0.243	0.243	0.14	0.360	0.209	42
Acetophenone	98-86-2	NS	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	3.47 J	-	-	NA
Aniline (Phenylamine, Aminobenzene)	62-53-3	5	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	-	-	NA
Anthracene	120-12-7	50	ug/l	3.36	3.68	3.06	0.682	0.633	0.546	3.367	0.620	82.000
Atrazine	1912-24-9	7.5	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	-	-	NA
Benzaldehyde	100-52-7	NS	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	-	-	NA
Benzidine	92-87-5	5	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	-	-	NA
Benzo(a)anthracene	56-55-3	**0.002**	ug/l	**1.06**	**1.17**	**1.72**	**1.43**	**1.49**	**0.976**	1.317	1.299	1
Benzo(a)pyrene	50-32-8	**0**	ug/l	**0.497**	**0.547**	**1.2**	**0.685**	**0.652**	**0.393**	0.748	0.577	23
Benzo(b)fluoranthene	205-99-2	**0.002**	ug/l	**0.421**	**0.691**	**1.21**	**0.928**	**0.9**	**0.612**	0.774	0.813	-5
Benzo(g,h,i)Perylene	191-24-2	NS	ug/l	0.266	0.295	0.64	0.551	0.624	0.386	0.400	0.520	-30
Benzo(k)fluoranthene	207-08-9	**0.002**	ug/l	**0.483**	**0.676**	**1.23**	**0.932**	**0.923**	**0.615**	0.796	0.823	-3
Benzoic Acid	65-85-0	NS	ug/l	33.4	38.8	33.8	94.4 D	85.5 D	64.9 D	35.333	81.60	-131
Benzyl Alcohol	100-51-6	NS	ug/l	11.9	13	12.5	<5 U	<5 U	<5 U	12.467	-	NA
Benzyl Butyl Phthalate	85-68-7	50	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	-	-	NA
Biphenyl (Diphenyl)	92-52-4	5	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	-	-	NA
Bis(2-chloroethoxy) methane	111-91-1	5	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	-	-	NA
Bis(2-chloroethyl) ether (2-chloroethyl ether)	111-44-4	1	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	-	-	NA
Bis(2-chloroisopropyl) ether	108-60-1	5	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	-	-	NA
Bis(2-ethylhexyl) phthalate	117-81-7	5	ug/l	1.36	1.53	3.59	2.65	1.95	1.24	2.16	1.947	10
Caprolactam	105-60-2	NS	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	-	-	NA
Carbazole	86-74-8	NS	ug/l	<5 U	9.46	7.55	<5 U	<5 U	<5 U	8.505	-	NA
Chrysene	218-01-9	**0.002**	ug/l	**0.68**	**0.766**	**1.53**	**1.45**	**1.43**	**0.994**	0.992	1.291	-30
Dibenz(a,h)anthracene	53-70-3	NS	ug/l	0.119	0.129	0.276	0.139	0.135	0.144	0.175	0.139	20
Dibenzofuran	132-64-9	NS	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	-	-	NA
Dibutyl phthalate	84-74-2	50	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	-	-	NA
Diethyl phthalate	84-66-2	50	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	-	-	NA
Dimethyl phthalate	131-11-3	50	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	-	-	NA
Dioctyl phthalate	117-84-0	50	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	-	-	NA
Diphenylamine	122-39-4	5	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	-	-	NA
Fluoranthene	206-44-0	50	ug/l	2.6	2.84	4.72	4.49	3.05	2.4	3.387	3.313	2
Fluorene	86-73-7	50	ug/l	2.88	3.51	3.23	1.26	1.22	0.883	3.207	1.121	65
Hexachlorobenzene	118-74-1	0.04	ug/l	<0.02 U	<0.02 U	<0.02 U	<0.02 U	<0.02 U	<0.02 U	-	-	NA
Hexachlorobutadiene	87-68-3	0.5	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	-	-	NA
Hexachlorocyclopentadiene	77-47-4	5	ug/l	<10 U	<10 U	<10 U	<10 U	<10 U	<10 U	-	-	NA
Hexachloroethane	67-72-1	5	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	-	-	NA
Indeno(1,2,3-cd)pyrene	193-39-5	**0.002**	ug/l	**0.237**	**0.261**	**0.574**	**0.496**	**0.528**	**0.337**	0.357	0.454	-27
Isophorone	78-59-1	50	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	-	-	NA
Naphthalene	91-20-3	**10**	ug/l	**70.3 D**	**82.3 D**	**166 D**	**37.6 D**	**41.7 D**	**24.7 D**	106.2	34.667	67
Nitrobenzene	98-95-3	0.4	ug/l	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	-	-	NA
n-Nitrosodimethylamine	62-75-9	NS	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	-	-	NA
n-Nitrosodi-N-Propylamine	621-64-7	NS	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	-	-	NA
n-Nitrosodiphenylamine	86-30-6	50	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	-	-	NA
Pentachlorophenol	87-86-5	1	ug/l	<0.25 U	0.868	<0.25 U	<0.25 U	<0.25 U	<0.25 U	0.868	-	NA
Phenanthrene	85-01-8	50	ug/l	5.72 D	8.69 D	7.85 D	5.61 D	5.85 D	4.15	7.420	5.203	30
Phenol	108-95-2	**1**	ug/l	**27.3**	**28**	**24.4**	<5 U	<5 U	<5 U	26.567	-	NA
Pyrene	129-00-0	50	ug/l	2.18	2.57	4.04	2.85	1.97	1.3	2.930	2.040	30
Pyridine	110-86-1	50	ug/l	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	-	-	NA
General Chemistry												
Total Organic Carbon	TOC	NS	ug/l	1,150,000 D	9,330,000 D	8,950,000 D	8,790,000 D	8,980,000 D	7,990,000 D	6477	8587	-33

Table 5
Treatability Study Report
Effectiveness Test Aqueous Phase Analytical Results Summary

Willets Point Development L-Parcel
Queens, New York
NYSDEC BCP Site No.: C241146H
Langan Project No.: 170197605

Notes:

CAS - Chemical Abstract Service
NS - No standard
ug/l - microgram per liter
NA - Not analyzed
RL - Reporting limit
<RL - Not detected

Groundwater sample analytical results are compared to the New York State Department of Environmental Conservation (NYSDEC) Title 6 Codes, Rules, and Regulations (NYCRR) Part 703.5 and the NYSDEC Technical and Operation Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards and Guidance Values for Class GA Water and published addenda (herein collectively referenced as "NYSDEC SGVs").

Qualifiers:

D - The concentration reported is a result of a diluted sample.
J - The analyte was detected above the method detection limit (MDL), but below the RL; therefore, the result is an estimated concentration.
U - The analyte was analyzed for, but was not detected at a level greater than or equal to the RL; the value shown in the table is the RL.

Exceedance Summary:

10 - Result exceeds NYSDEC SGVs

Table 6
Treatability Study Report
Effectiveness Test Soil Analytical Results Summary

Willets Point Development L-Parcel
Queens, New York
NYSDEC BCP Site No.: C241146H
Langan Project No.: 170197605

Analyte	CAS Number	NYSDEC Part 375 Protection of Groundwater SCOs	Sample Group	CONTROL GROUP	CONTROL GROUP	CONTROL GROUP	TREATMENT GROUP	TREATMENT GROUP	TREATMENT GROUP	Avg. Concentration in Controls	Avg. Concentration in Treatment	Percent Reduction in Concentration
			Location	TS-01-S-E1	TS-01-S-E2	TS-01-S-E3	TS-01-S-E4	TS-01-S-E5	TS-01-S-E6			
			Sample Name	TS-01-S-E1_030326	TS-01-S-E2_030326	TS-01-S-E3_030326	TS-01-S-E4_030326	TS-01-S-E5_030326	TS-01-S-E6_030326			
			Sample Date	03/03/2026	03/03/2026	03/03/2026	03/03/2026	03/03/2026	03/03/2026			
			Unit	Result	Result	Result	Result	Result	Result	Result	Result	Result
Volatile Organic Compounds												
1,1,1,2-Tetrachloroethane	630-20-6	NS	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
1,1,1-Trichloroethane	71-55-6	0.68	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
1,1,2,2-Tetrachloroethane	79-34-5	NS	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	NS	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
1,1,2-Trichloroethane	79-00-5	NS	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
1,1-Dichloroethane	75-34-3	0.27	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
1,1-Dichloroethene	75-35-4	0.33	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
1,2,3-Trichlorobenzene	87-61-6	NS	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
1,2,3-Trichloropropane	96-18-4	NS	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
1,2,4-Trichlorobenzene	120-82-1	NS	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
1,2,4-Trimethylbenzene	95-63-6	**5.9**	mg/kg	**43 D**	**29 D**	0.52	0.4	0.31	0.42	24.2	0.377	98
1,2-Dibromo-3-Chloropropane	96-12-8	NS	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	NS	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
1,2-Dichlorobenzene	95-50-1	1.1	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
1,2-Dichloroethane	107-06-2	0.02	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	0.0086	-	0.0086	NA
1,2-Dichloropropane	78-87-5	NS	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	3.1	mg/kg	0.33	0.16	0.15	0.13	0.099	0.14	**0.213**	**0.123**	42
1,3-Dichlorobenzene	541-73-1	2.6	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
1,4-Dichlorobenzene	106-46-7	1.8	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
2-Hexanone (MBK)	591-78-6	NS	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
Acetone	67-64-1	**0.03**	mg/kg	**0.12**	**0.1**	**0.088**	**0.29**	**0.21**	**0.32**	0.103	0.273	-166
Acrolein	107-02-8	NS	mg/kg	<0.013 U	<0.012 U	<0.013 U	<0.015 U	<0.012 U	<0.015 U	-	-	NA
Acrylonitrile	107-13-1	NS	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
Benzene	71-43-2	**0.06**	mg/kg	**0.4**	**0.41**	**0.52**	**0.24**	**0.21**	**0.26**	**0.443**	**0.237**	47
Bromochloromethane	74-97-5	NS	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
Bromodichloromethane	75-27-4	NS	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
Bromoform	75-25-2	NS	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
Bromomethane	74-83-9	NS	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
Carbon Disulfide	75-15-0	NS	mg/kg	0.0038 J	0.0032 J	0.0044 J	0.049	0.028	0.037	-	0.038	NA
Carbon Tetrachloride	56-23-5	0.76	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
Chlorobenzene	108-90-7	4.5	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
Chloroethane	75-00-3	NS	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
Chloroform	67-66-3	0.37	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
Chloromethane	74-87-3	NS	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
Cis-1,2-Dichloroethene	156-59-2	0.19	mg/kg	<0.0064 U	0.0036 J	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
Cis-1,3-Dichloropropene	10061-01-5	NS	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
Cyclohexane	110-82-7	NS	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	0.055	0.026	0.049	-	0.0433	NA
Cymene	99-87-6	NS	mg/kg	0.01	<0.0062 U	0.0058 J	0.0041 J	0.0031 J	0.0045 J	-	-	NA
Dibromochloromethane	124-48-1	NS	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
Dibromomethane	74-95-3	NS	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
Dichlorodifluoromethane	75-71-8	NS	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
Ethylbenzene	100-41-4	1	mg/kg	0.12	0.092	0.073	0.055	0.04	0.053	0.0950	0.0493	48
Hexachlorobutadiene	87-68-3	NS	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
Isopropylbenzene (Cumene)	98-82-8	NS	mg/kg	0.037	0.022	0.018	0.014	0.011	0.013	0.0257	0.0127	51
M,P-Xylene	179601-23-1	NS	mg/kg	0.48	0.36	0.32	0.24	0.18	0.26	0.3867	0.2267	42
Methyl Acetate	79-20-9	NS	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
Methyl Ethyl Ketone (2-Butanone)	78-93-3	0.1	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	0.038	0.028	0.037	-	0.034333333	NA
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	108-10-1	NS	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
Methylcyclohexane	108-87-2	NS	mg/kg	0.027	0.031	0.042	0.04	0.021	0.037	0.0333	0.0327	2
Methylene Chloride	75-09-2	0.05	mg/kg	0.016	0.014	0.016	0.016	0.015	0.027	0.0153	0.0193	-27
n-Butylbenzene	104-51-8	18	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	0.021	<0.0058 U	0.022	-	0.0215	NA
n-Propylbenzene	103-65-1	5	mg/kg	0.099	0.052	0.044	0.03	0.025	0.028	0.065	0.03	58
o-Xylene (1,2-Dimethylbenzene)	95-47-6	NS	mg/kg	0.29	0.22	0.21	0.17	0.12	0.19	0.240	0.16	34
Sec-Butylbenzene	135-98-8	25	mg/kg	0.018	0.0074	0.0079	0.0062 J	0.0054 J	0.0064 J	0.0111	-	NA
Styrene	100-42-5	NS	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
T-Butylbenzene	98-06-6	11	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
Tert-Butyl Alcohol	75-65-0	NS	mg/kg	<0.032 U	<0.031 U	<0.033 U	0.14	0.1	0.12	-	0.120	NA
Tert-Butyl Methyl Ether (MTBE)	1634-04-4	**0.1**	mg/kg	0.098	**0.12**	**0.13**	0.043	0.025	0.028	0.116	0.032	72
Tetrachloroethene (PCE)	127-18-4	1.3	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
Toluene	108-88-3	0.7	mg/kg	0.23	0.22	0.25	0.16	0.1	0.15	0.233	0.1367	41
Total Xylenes	1330-20-7	1.2	mg/kg	0.78	0.58	0.53	0.41	0.3	0.45	0.63	0.387	39
Trans-1,2-Dichloroethene	156-60-5	0.19	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
Trans-1,3-Dichloropropene	10061-02-6	NS	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
Trichloroethene (TCE)	79-01-6	0.47	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
Trichlorofluoromethane	75-69-4	NS	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA
Vinyl Chloride	75-01-4	0.03	mg/kg	<0.0064 U	<0.0062 U	<0.0067 U	<0.0076 U	<0.0058 U	<0.0075 U	-	-	NA

Table 6
Treatability Study Report
Effectiveness Test Soil Analytical Results Summary

Willets Point Development L-Parcel
Queens, New York
NYSDEC BCP Site No.: C241146H
Langan Project No.: 170197605

Analyte	CAS Number	NYSDEC Part 375 Protection of Groundwater SCOs	Sample Group	CONTROL GROUP	CONTROL GROUP	CONTROL GROUP	TREATMENT GROUP	TREATMENT GROUP	TREATMENT GROUP	Avg. Concentration in Controls	Avg. Concentration in Treatment	Percent Reduction in Concentration
			Location	TS-01-S-E1	TS-01-S-E2	TS-01-S-E3	TS-01-S-E4	TS-01-S-E5	TS-01-S-E6			
			Sample Name	TS-01-S-E1_030326	TS-01-S-E2_030326	TS-01-S-E3_030326	TS-01-S-E4_030326	TS-01-S-E5_030326	TS-01-S-E6_030326			
			Sample Date	03/03/2026	03/03/2026	03/03/2026	03/03/2026	03/03/2026	03/03/2026			
			Unit	Result	Result	Result	Result	Result	Result	Result	Result	Result
Semi-Volatile Organic Compounds												
1,2,4,5-Tetrachlorobenzene	95-94-3	NS	mg/kg	<0.231 U	<0.223 U	<0.221 U	<0.244 U	<11.7 U	<4.74 U	-	-	NA
1,2-Diphenylhydrazine	122-66-7	NS	mg/kg	<0.116 U	<0.112 U	<0.11 U	<0.122 U	<5.87 U	<2.37 U	-	-	NA
2,3,4,6-Tetrachlorophenol	58-90-2	NS	mg/kg	<0.231 U	<0.223 U	<0.221 U	<0.244 U	<11.7 U	<4.74 U	-	-	NA
2,4,5-Trichlorophenol	95-95-4	NS	mg/kg	<0.116 U	<0.112 U	<0.11 U	<0.122 U	<5.87 U	<2.37 U	-	-	NA
2,4,6-Trichlorophenol	88-06-2	NS	mg/kg	<0.116 U	<0.112 U	<0.11 U	<0.122 U	<5.87 U	<2.37 U	-	-	NA
2,4-Dichlorophenol	120-83-2	NS	mg/kg	<0.116 U	<0.112 U	<0.11 U	<0.122 U	<5.87 U	<2.37 U	-	-	NA
2,4-Dimethylphenol	105-67-9	NS	mg/kg	<0.116 U	<0.112 U	<0.11 U	<0.122 U	<5.87 U	<2.37 U	-	-	NA
2,4-Dinitrophenol	51-28-5	NS	mg/kg	<0.231 U	<0.223 U	<0.221 U	<0.244 U	<11.7 U	<4.74 U	-	-	NA
2,4-Dinitrotoluene	121-14-2	NS	mg/kg	<0.116 U	<0.112 U	<0.11 U	<0.122 U	<5.87 U	<2.37 U	-	-	NA
2,6-Dinitrotoluene	606-20-2	NS	mg/kg	<0.116 U	<0.112 U	<0.11 U	<0.122 U	<5.87 U	<2.37 U	-	-	NA
2-Chloronaphthalene	91-58-7	NS	mg/kg	<0.116 U	<0.112 U	<0.11 U	<0.122 U	<5.87 U	<2.37 U	-	-	NA
2-Chlorophenol	95-57-8	NS	mg/kg	<0.116 U	<0.112 U	<0.11 U	<0.122 U	<5.87 U	<2.37 U	-	-	NA
2-Methylnaphthalene	91-57-6	NS	mg/kg	1.3	0.971	2.7	11.9 D	29.7 D	9.3 D	1.657	-	NA
2-Methylphenol (o-Cresol)	95-48-7	0.33	mg/kg	<0.116 U	0.0599 J	<0.11 U	<0.122 U	<5.87 U	<2.37 U	-	-	NA
2-Nitroaniline	88-74-4	NS	mg/kg	<0.231 U	<0.223 U	<0.221 U	<0.244 U	<11.7 U	<4.74 U	-	-	NA
2-Nitrophenol	88-75-5	NS	mg/kg	<0.116 U	<0.112 U	<0.11 U	<0.122 U	<5.87 U	<2.37 U	-	-	NA
3 & 4 Methylphenol (m&p Cresol)	65794-96-9	0.33	mg/kg	<0.116 U	<0.112 U	<0.11 U	<0.122 U	<5.87 U	<2.37 U	-	-	NA
3,3'-Dichlorobenzidine	91-94-1	NS	mg/kg	<0.116 U	<0.112 U	<0.11 U	<0.122 U	<5.87 U	<2.37 U	-	-	NA
3-Nitroaniline	99-09-2	NS	mg/kg	<0.231 U	<0.223 U	<0.221 U	<0.244 U	<11.7 U	<4.74 U	-	-	NA
4,6-Dinitro-2-Methylphenol	534-52-1	NS	mg/kg	<0.231 U	<0.223 U	<0.221 U	<0.244 U	<11.7 U	<4.74 U	-	-	NA
4-Bromophenyl Phenyl Ether	101-55-3	NS	mg/kg	<0.116 U	<0.112 U	<0.11 U	<0.122 U	<5.87 U	<2.37 U	-	-	NA
4-Chloro-3-Methylphenol	59-50-7	NS	mg/kg	<0.116 U	0.0706 J	<0.11 U	<0.122 U	<5.87 U	<2.37 U	-	-	NA
4-Chloroaniline	106-47-8	NS	mg/kg	<0.116 U	<0.112 U	<0.11 U	<0.122 U	<5.87 U	<2.37 U	-	-	NA
4-Chlorophenyl Phenyl Ether	7005-72-3	NS	mg/kg	<0.116 U	<0.112 U	<0.11 U	<0.122 U	<5.87 U	<2.37 U	-	-	NA
4-Nitroaniline	100-01-6	NS	mg/kg	<0.231 U	<0.223 U	<0.221 U	<0.244 U	<11.7 U	<4.74 U	-	-	NA
4-Nitrophenol	100-02-7	NS	mg/kg	<0.231 U	0.201 J	<0.221 U	<0.244 U	<11.7 U	<4.74 U	-	-	NA
Acenaphthene	83-32-9	98	mg/kg	0.354	0.274	1.87	0.673	<5.87 U	1.92 JD	0.833	0.673	19
Acenaphthylene	208-96-8	365	mg/kg	0.111 J	0.118	0.329	1.24	<5.87 U	<2.37 U	0.2235	1.24	-455
Acetophenone	98-86-2	NS	mg/kg	<0.116 U	0.118	<0.11 U	<0.122 U	<5.87 U	<2.37 U	0.118	-	NA
Aniline (Phenylamine, Aminobenzene)	62-53-3	0.04	mg/kg	<0.464 U	<0.448 U	<0.442 U	<0.49 U	<23.5 U	<9.51 U	-	-	NA
Anthracene	120-12-7	1000	mg/kg	0.645	2.26	4.28 D	1.36	2.96 JD	2.85 D	2.395	2.39	0
Atrazine	1912-24-9	NS	mg/kg	<0.116 U	0.0787 J	<0.11 U	<0.122 U	<5.87 U	<2.37 U	-	-	NA
Benzaldehyde	100-52-7	NS	mg/kg	<0.116 U	2.18	<0.11 U	<0.122 U	<5.87 U	<2.37 U	2.18	-	NA
Benzidine	92-87-5	NS	mg/kg	<0.464 U	<0.448 U	<0.442 U	<0.49 U	<23.5 U	<9.51 U	-	-	NA
Benzo(a)anthracene	56-55-3	**1**	mg/kg	**1.01**	0.875	**5.16 D**	**2.21**	**4.18 JD**	**3.25 D**	2.348	3.213	-37
Benzo(a)pyrene	50-32-8	22	mg/kg	0.68	0.682	3.02 D	1.47	3.19 JD	2.7 D	1.461	2.453	-68
Benzo(b)fluoranthene	205-99-2	**2.1**	mg/kg	0.663	0.607	**2.96 D**	1.39	**3.01 JD**	**2.41 D**	1.410	2.270	-61
Benzo(g,h,i)Perylene	191-24-2	1000	mg/kg	0.34	0.317	2.32	0.607	<5.87 U	<2.37 U	0.992	0.607	39
Benzo(k)fluoranthene	207-08-9	**2**	mg/kg	0.584	0.561	**2.98 D**	1.2	<5.87 U	**2.26 JD**	1.375	1.73	-26
Benzoic Acid	65-85-0	NS	mg/kg	<0.116 U	0.265	<0.11 U	<0.122 U	<5.87 U	<2.37 U	0.265	-	NA
Benzyl Alcohol	100-51-6	NS	mg/kg	<0.116 U	0.0626 J	<0.11 U	<0.122 U	<5.87 U	<2.37 U	-	-	NA
Benzyl Butyl Phthalate	85-68-7	NS	mg/kg	0.261	0.455	0.548	0.704	<5.87 U	1.23 JD	0.421	0.967	-130
Biphenyl (Diphenyl)	92-52-4	NS	mg/kg	0.0926 J	0.0778 J	0.229	0.52	<5.87 U	<2.37 U	0.229	0.52	-127
Bis(2-chloroethoxy) methane	111-91-1	NS	mg/kg	<0.116 U	<0.112 U	<0.11 U	<0.122 U	<5.87 U	<2.37 U	-	-	NA
Bis(2-chloroethyl) ether (2-chloroethyl ether)	111-44-4	NS	mg/kg	<0.116 U	<0.112 U	<0.11 U	<0.122 U	<5.87 U	<2.37 U	-	-	NA
Bis(2-chloroisopropyl) ether	108-60-1	NS	mg/kg	<0.116 U	<0.112 U	<0.11 U	<0.122 U	<5.87 U	<2.37 U	-	-	NA
Bis(2-ethylhexyl) phthalate	117-81-7	NS	mg/kg	1.23	0.983	2.44	1.3	3.1 JD	3.51 D	1.551	2.637	-70
Caprolactam	105-60-2	NS	mg/kg	<0.231 U	<0.223 U	<0.221 U	<0.244 U	<11.7 U	<4.74 U	-	-	NA
Carbazole	86-74-8	NS	mg/kg	0.262	0.198	0.904	0.309	<5.87 U	<2.37 U	0.455	0.309	32
Chrysene	218-01-9	**1**	mg/kg	0.9	0.893	**5.12 D**	**2.02**	**3.57 JD**	**3.4 D**	2.304	2.997	-30
Dibenz(a,h)anthracene	53-70-3	1000	mg/kg	0.119	<0.112 U	0.29	<0.122 U	<5.87 U	<2.37 U	0.205	-	NA
Dibenzofuran	132-64-9	110	mg/kg	0.235	0.173	1.18	<0.122 U	<5.87 U	1.42 JD	0.529	1.420	-168
Dibutyl phthalate	84-74-2	NS	mg/kg	<0.116 U	0.0841 J	0.146	<0.122 U	<5.87 U	<2.37 U	0.146	-	NA
Diethyl phthalate	84-66-2	NS	mg/kg	<0.116 U	<0.112 U	<0.11 U	<0.122 U	<5.87 U	<2.37 U	-	-	NA
Dimethyl phthalate	131-11-3	NS	mg/kg	<0.116 U	0.0671 J	<0.11 U	<0.122 U	<5.87 U	<2.37 U	-	-	NA
Dioctyl phthalate	117-84-0	NS	mg/kg	0.293	0.0787 J	0.0786 J	0.116 J	<5.87 U	<2.37 U	0.150	-	NA
Diphenylamine	122-39-4	NS	mg/kg	<0.231 U	<0.223 U	<0.221 U	<0.244 U	<11.7 U	<4.74 U	-	-	NA
Fluoranthene	206-44-0	1000	mg/kg	2.28	1.87	12.4 D	5.55 D	7.18 D	8.62 D	5.517	7.117	-29
Fluorene	86-73-7	386	mg/kg	0.45	0.338	2.95	2.02	5.12 JD	2.56 D	1.246	3.233	-159
Hexachlorobenzene	118-74-1	3.2	mg/kg	<0.116 U	0.105 J	<0.11 U	<0.122 U	<5.87 U	<2.37 U	-	-	NA
Hexachlorobutadiene	87-68-3	NS	mg/kg	<0.116 U	<0.112 U	<0.11 U	<0.122 U	<5.87 U	<2.37 U	-	-	NA
Hexachlorocyclopentadiene	77-47-4	NS	mg/kg	<0.116 U	<0.112 U	<0.11 U	<0.122 U	<5.87 U	<2.37 U	-	-	NA
Hexachloroethane	67-72-1	NS	mg/kg	<0.116 U	0.185	<0.11 U	<0.122 U	<5.87 U	<2.37 U	0.185	-	NA
Indeno(1,2,3-cd)pyrene	193-39-5	6.6	mg/kg	0.272	0.291	2.76	0.599	<5.87 U	<2.37 U	1.108	0.599	46
Isophorone	78-59-1	NS	mg/kg	<0.116 U	<0.112 U	<0.11 U	<0.122 U	<5.87 U	<2.37 U	-	-	NA
Naphthalene	91-20-3	**12**	mg/kg	2.45	1.79	4.28 D	**25.8 D**	**62.4 D**	**19.4 D**	2.84	35.9	-1163
Nitrobenzene	98-95-3	0.08	mg/kg	<0.116 U	<0.112 U	<0.11 U	<0.122 U	<5.87 U	<2.37 U	-	-	NA
n-Nitrosodimethylamine	62-75-9	NS	mg/kg	<0.116 U	<0.112 U	<0.11 U	<0.122 U	<5.87 U	<2.37 U	-	-	NA
n-Nitrosodi-N-Propylamine	621-64-7	NS	mg/kg	<0.116 U	<0.112 U	<0.11 U	<0.122 U	<5.87 U	<2.37 U	-	-	NA
n-Nitrosodiphenylamine	86-30-6	NS	mg/kg	<0.116 U	0.0742 J	<0.11 U	<0.122 U	<5.87 U	<2.37 U	-	-	NA
Pentachlorophenol	87-86-5	0.8	mg/kg	<0.116 U	<0.112 U	<0.11 U	<0.122 U	<5.87 U	<2.37 U	-	-	NA
Phenanthrene	85-01-8	1000	mg/kg	2.56	2.08	12 D	6.21 D	11.3 D	9.99 D	5.547	9.167	-65
Phenol	108-95-2	0.33	mg/kg	<0.116 U	<0.112 U	<0.11 U	<0.122 U	<5.87 U	<2.37 U	-	-	NA
Pyrene	129-00-0	1000	mg/kg	2.66	2.64	12.6 D	5.89 D	8.17 D	8.24 D	5.967	7.433	NA
Pyridine	110-86-1	NS	mg/kg	<0.464 U	<0.448 U	<0.442 U	<0.49 U	<23.5 U	<9.51 U	-	-	NA
General Chemistry												
Solids, Percent	SOLID	NS	Percent	70.2	71.6	75.5	64	70.9	70.2			

Table 6
Treatability Study Report
Effectiveness Test Soil Analytical Results Summary

Willets Point Development L-Parcel
Queens, New York
NYSDEC BCP Site No.: C241146H
Langan Project No.: 170197605

Notes:

CAS - Chemical Abstract Service
NS - No standard
mg/kg - milligram per kilogram
NA - Not analyzed
RL - Reporting limit
<RL - Not detected

Soil sample analytical results are compared to the New York State Department of Environmental Conservation (NYSDEC) Title 6 of the Official Compilation of New York Codes, Rules, and Regulations (NYCRR) Part 375 Unrestricted Use Soil Cleanup Objectives (SCO) (December 2025).

Criterion comparisons for 3- & 4-methylphenol (m&p cresol) are provided for reference. Promulgated SCOs are for 3-methylphenol (m-cresol) and 4-methylphenol (p-cresol).

Qualifiers:

D - The concentration reported is a result of a diluted sample.

J - The analyte was detected above the method detection limit (MDL), but below the RL; therefore, the result is an estimated concentration.

U - The analyte was analyzed for, but was not detected at a level greater than or equal to the RL; the value shown in the table is the RL.

Exceedance Summary:

10 - Result exceeds Protection of Groundwater SCOs

Table 7
Groundwater Delineation
Groundwater Sample Analytical Results

Willets Point Development L-Parcel
Queens, New York
NYSDEC BCP Site No.: C241146H
Langan Project No.: 170197605

Analyte	CAS Number	NYSDEC SGVs	Location	TMW01	TMW02	TMW03	TMW03	TMW04
			Sample Name	TMW01_012926	TMW02_012926	TMW03_012926	GWDUP01_012926	TMW04_012926
			Sample Date	01/29/2026	01/29/2026	01/29/2026	01/29/2026	01/29/2026
			Unit	Result	Result	Result	Result	Result
Volatile Organic Compounds								
1,1,1,2-Tetrachloroethane	630-20-6	5	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,1,1-Trichloroethane	71-55-6	5	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,1,2,2-Tetrachloroethane	79-34-5	5	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	5	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,1,2-Trichloroethane	79-00-5	1	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,1-Dichloroethane	75-34-3	5	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,1-Dichloroethene	75-35-4	5	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,2,3-Trichlorobenzene	87-61-6	5	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,2,3-Trichloropropane	96-18-4	0.04	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,2,4-Trichlorobenzene	120-82-1	5	ug/l	<0.5 U	<0.5 U	0.18 J	0.17 J	<0.5 U
1,2,4-Trimethylbenzene	95-63-6	**5**	ug/l	**48.2 B**	**11.4 B**	**19.9 B**	**19.7 B**	**61.7 B**
1,2-Dibromo-3-Chloropropane	96-12-8	0.04	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	0.0006	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,2-Dichlorobenzene	95-50-1	3	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,2-Dichloroethane	107-06-2	0.6	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,2-Dichloropropane	78-87-5	1	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	**5**	ug/l	**14.7**	3.6	**6.75**	**6.58**	**21.4**
1,3-Dichlorobenzene	541-73-1	3	ug/l	<0.5 U	0.31 J	<0.5 U	<0.5 U	<0.5 U
1,4-Dichlorobenzene	106-46-7	3	ug/l	<0.5 U	0.93	<0.5 U	<0.5 U	<0.5 U
2-Hexanone (MBK)	591-78-6	50	ug/l	<0.5 UJ	<0.5 UJ	<0.5 UJ	<0.5 UJ	<0.5 UJ
Acetone	67-64-1	**50**	ug/l	44 B	11.4 J	12.6 J	10.9 J	**52.4 B**
Acrolein	107-02-8	5	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
Acrylonitrile	107-13-1	**5**	ug/l	<0.5 U	**8.64**	<0.5 UJ	**9.8 J**	<0.5 U
Benzene	71-43-2	**1**	ug/l	**12**	**6.21**	**28.7**	**25.2**	**45.9**
Bromochloromethane	74-97-5	5	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
Bromodichloromethane	75-27-4	50	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
Bromoform	75-25-2	50	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
Bromomethane	74-83-9	5	ug/l	<2 UJ	<2 UJ	<2 UJ	<2 UJ	<2 UJ
Carbon Disulfide	75-15-0	60	ug/l	0.43 J	<0.5 U	<0.5 U	<0.5 U	2.29
Carbon Tetrachloride	56-23-5	5	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
Chlorobenzene	108-90-7	5	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
Chloroethane	75-00-3	5	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
Chloroform	67-66-3	7	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
Chloromethane	74-87-3	5	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
Cis-1,2-Dichloroethene	156-59-2	5	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
Cis-1,3-Dichloropropene	10061-01-5	0.4	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
Cyclohexane	110-82-7	NS	ug/l	1.95	1.96	1.63	1.42	4.78
Cymene	99-87-6	5	ug/l	0.74	<0.5 U	1.78	1.64	1.04
Dibromochloromethane	124-48-1	50	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
Dibromomethane	74-95-3	5	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
Dichlorodifluoromethane	75-71-8	**5**	ug/l	<0.5 U	**6.69**	<0.5 U	<0.5 U	<0.5 U
Ethylbenzene	100-41-4	**5**	ug/l	**22.1**	**5.8**	**9.42**	**9.34**	**40.8**
Hexachlorobutadiene	87-68-3	0.5	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
Isopropylbenzene (Cumene)	98-82-8	5	ug/l	2.43	1.09	2.75	2.73	3.67
M,P-Xylene	179601-23-1	**5**	ug/l	**58.9 B**	**18.9 B**	**26 B**	**25.6 B**	**92.1 B**
Methyl Acetate	79-20-9	NS	ug/l	9.58	<0.5 U	<0.5 U	<0.5 U	<0.5 U
Methyl Ethyl Ketone (2-Butanone)	78-93-3	50	ug/l	7.7 J	<0.5 UJ	2.22 J	1.58 J	9.48 J
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	108-10-1	NS	ug/l	6.71 J	0.95 J	1.39 J	1.22 J	21.9 J
Methylcyclohexane	108-87-2	NS	ug/l	1.59	1.12	2.17	2.18	2.82
Methylene Chloride	75-09-2	5	ug/l	<2 U	<2 U	<2 U	<2 U	<2 U
n-Butylbenzene	104-51-8	5	ug/l	<0.5 U	<0.5 U	0.67	0.4 J	2.02
n-Propylbenzene	103-65-1	**5**	ug/l	4.84	1.43	3.8	3.73	**5.97**
o-Xylene (1,2-Dimethylbenzene)	95-47-6	**5**	ug/l	**39.2 B**	4.08 J	**12.4 B**	**12.2 B**	**62.6 B**
Sec-Butylbenzene	135-98-8	5	ug/l	0.74	<0.5 U	1.09	1.04	0.63
Styrene	100-42-5	**5**	ug/l	**6.96**	0.55	1.56 J	<0.5 UJ	**23.5**
T-Butylbenzene	98-06-6	5	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
Tert-Butyl Alcohol	75-65-0	NS	ug/l	503 D	179	1,450 D	1,430 D	438 D
Tert-Butyl Methyl Ether (MTBE)	1634-04-4	**10**	ug/l	**94 J**	**70.9 J**	**79 J**	**74.4 J**	**438 J**
Tetrachloroethene (PCE)	127-18-4	5	ug/l	<0.5 UJ	<0.5 UJ	<0.5 UJ	<0.5 UJ	<0.5 UJ
Toluene	108-88-3	**5**	ug/l	**43 J**	2.44 J	**16.7 J**	**16.3 J**	**69.3 J**
Total Xylenes	1330-20-7	**5**	ug/l	**98.1 B**	**23 B**	**38.3 B**	**37.8 B**	**155 B**
Trans-1,2-Dichloroethene	156-60-5	5	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
Trans-1,3-Dichloropropene	10061-02-6	0.4	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
Trichloroethene (TCE)	79-01-6	5	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.35 J
Trichlorofluoromethane	75-69-4	5	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
Vinyl Chloride	75-01-4	2	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U

Table 7
Groundwater Delineation
Groundwater Sample Analytical Results

Willets Point Development L-Parcel
Queens, New York
NYSDEC BCP Site No.: C241146H
Langan Project No.: 170197605

Notes:

CAS - Chemical Abstract Service
NS - No standard
ug/l - microgram per liter
NA - Not analyzed
RL - Reporting limit
<RL - Not detected

Groundwater sample analytical results are compared to the New York State Department of Environmental Conservation (NYSDEC) Title 6 Codes, Rules, and Regulations (NYCRR) Part 703.5 and the NYSDEC Technical and Operation Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards and Guidance Values for Class GA Water and published addenda (herein collectively referenced as "NYSDEC SGVs").

Qualifiers:

D - The concentration reported is a result of a diluted sample.
B - The analyte was found in the associated analysis batch blank.
J - The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample.
UJ - The analyte was not detected at a level greater than or equal to the RL; however, the reported RL is approximate and may be inaccurate or imprecise.
U - The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the RL or the sample concentration for results impacted by blank contamination.

Exceedance Summary:

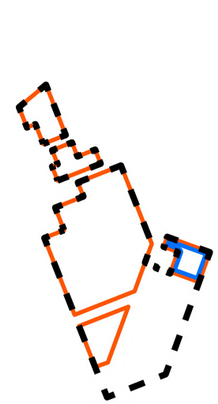
10 - Result exceeds NYSDEC SGVs

FIGURES

Legend

- Approximate BCP Site Boundary
- Former Willets Point Development BCP Site Boundary
- Former OU-2 Boundary
- Tax Lot

Reference Map



Notes:
1. Light Gray Canvas basemap provided through Langan's Esri and ArcGIS software licensing and ArcGIS Online.
2. Topographic basemap adapted from United States Geological Survey (USGS) 7.5-Minute Series Topographical Maps, Flushing, New York, Quadrangle.
3. Tax parcel data provided by the New York City Department of City Planning, MapPLUTO 23v2, and a survey prepared by Langan, July 28, 2023.
4. BCP - Brownfield Cleanup Program

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Project
WILLETS POINT DEVELOPMENT L-PARCEL
BCP SITE NO. C241146H
QUEENS NEW YORK

Figure Title
SITE LOCATION AND LAYOUT PLAN

Project No.	Figure No.
170197605	1
Date: 3/9/2026	
Scale: 1"=250'	
Drawn By: GS	Figure 1 of 3

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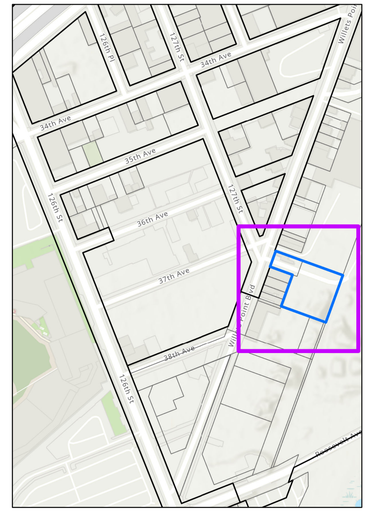
Legend

- Approximate BCP Site Boundary
- Tax Parcel
- Post-Excavation In-Situ Treatment with PetroFix™ via Direct Mixing
- Oxygen Release Compound (ORC) Advanced® Treatment Area via Direct Mixing
- Approximate Location of Previously Installed Monitoring Well Sampled for Treatability Study
- Approximate Location of Previously Installed Monitoring Well Not Sampled for Treatability Study
- Approximate Location of Temporary Monitoring Well Sampled for Treatability Study
- Approximate Location of Soil Boring for Treatability Study

Notes:
1. Imagery provided through Langan's subscription to Nearmap.com. Flown on 07/03/2025.
2. Tax parcel data provided by the New York City Department of City Planning, MapPLUTO 23v2, and a survey prepared by Langan, July 28, 2023.
3. BCP - Brownfield Cleanup Program



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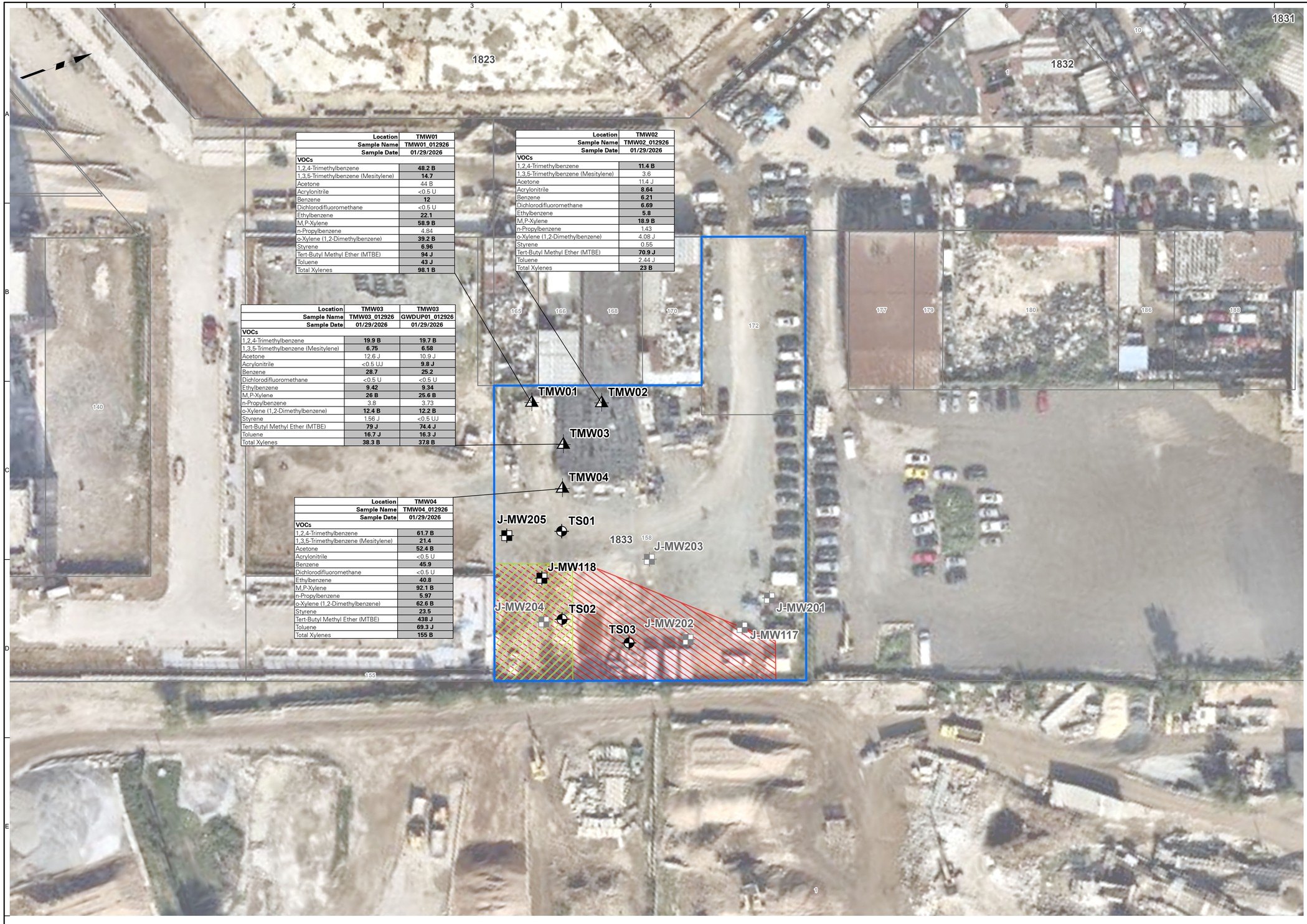
Project	WILLETS POINT DEVELOPMENT L-PARCEL BCP SITE NO. C241146H QUEENS NEW YORK
Figure Title	TREATABILITY STUDY SAMPLE LOCATION MAP
Project No.	170197601
Date	4/8/2026
Scale	1" = 30 feet
Drawn By	MG
Submission Date	
Figure.	2
	Figure 2 of 3

Path: \\langan.com\data\NYC\data\170197601\Arc\GIS\APR\170197601_SMP_FER\170197601_SMP_FER_Site\Map.aprx Date: 4/8/2026 User: mgeorgalas Time: 1:33 PM



Location	TMW01
Sample Name	TMW01_012926
Sample Date	01/29/2026
VOCs	
1,2,4-Trimethylbenzene	**48.2 B**
1,3,5-Trimethylbenzene (Mesitylene)	**14.7**
Acetone	44 B
Acrylonitrile	<0.5 U
Benzene	**12**
Dichlorodifluoromethane	<0.5 U
Ethylbenzene	**22.1**
M,P-Xylene	**58.9 B**
n-Propylbenzene	4.84
o-Xylene (1,2-Dimethylbenzene)	**39.2 B**
Styrene	**6.96**
Tert-Butyl Methyl Ether (MTBE)	**94 J**
Toluene	**43 J**
Total Xylenes	**98.1 B**

Location	TMW02
Sample Name	TMW02_012926
Sample Date	01/29/2026
VOCs	
1,2,4-Trimethylbenzene	**11.4 B**
1,3,5-Trimethylbenzene (Mesitylene)	3.6
Acetone	11.4 J
Acrylonitrile	**8.64**
Benzene	**6.21**
Dichlorodifluoromethane	**6.69**
Ethylbenzene	**5.8**
M,P-Xylene	**18.9 B**
n-Propylbenzene	1.43
o-Xylene (1,2-Dimethylbenzene)	4.08 J
Styrene	0.55
Tert-Butyl Methyl Ether (MTBE)	**70.9 J**
Toluene	2.44 J
Total Xylenes	**23 B**

Location	TMW03	TMW03
Sample Name	TMW03_012926	GWDUP01_012926
Sample Date	01/29/2026	01/29/2026
VOCs		
1,2,4-Trimethylbenzene	**19.9 B**	**19.7 B**
1,3,5-Trimethylbenzene (Mesitylene)	**6.75**	**6.58**
Acetone	12.6 J	10.9 J
Acrylonitrile	<0.5 UJ	**9.8 J**
Benzene	**28.7**	**25.2**
Dichlorodifluoromethane	<0.5 U	<0.5 U
Ethylbenzene	**9.42**	**9.34**
M,P-Xylene	**26 B**	**25.6 B**
n-Propylbenzene	3.8	3.73
o-Xylene (1,2-Dimethylbenzene)	**12.4 B**	**12.2 B**
Styrene	1.56 J	<0.5 UJ
Tert-Butyl Methyl Ether (MTBE)	**79 J**	**74.4 J**
Toluene	**16.7 J**	**16.3 J**
Total Xylenes	**38.3 B**	**37.8 B**

Location	TMW04
Sample Name	TMW04_012926
Sample Date	01/29/2026
VOCs	
1,2,4-Trimethylbenzene	**61.7 B**
1,3,5-Trimethylbenzene (Mesitylene)	**21.4**
Acetone	**52.4 B**
Acrylonitrile	<0.5 U
Benzene	**45.9**
Dichlorodifluoromethane	<0.5 U
Ethylbenzene	**40.8**
M,P-Xylene	**92.1 B**
n-Propylbenzene	**5.97**
o-Xylene (1,2-Dimethylbenzene)	**62.6 B**
Styrene	**23.5**
Tert-Butyl Methyl Ether (MTBE)	**438 J**
Toluene	**69.3 J**
Total Xylenes	**155 B**

Legend

- Approximate BCP Site Boundary
- Tax Parcel
- Post-Excavation In-Situ Treatment with PetroFix™ via Direct Mixing
- Oxygen Release Compound (ORC) Advanced® Treatment Area via Direct Mixing
- Approximate Location of Previously Installed Monitoring Well Sampled for Treatability Study
- Approximate Location of Previously Installed Monitoring Well Not Sampled for Treatability Study
- Approximate Location of Temporary Monitoring Well Sampled for Treatability Study
- Approximate Location of Soil Boring for Treatability Study

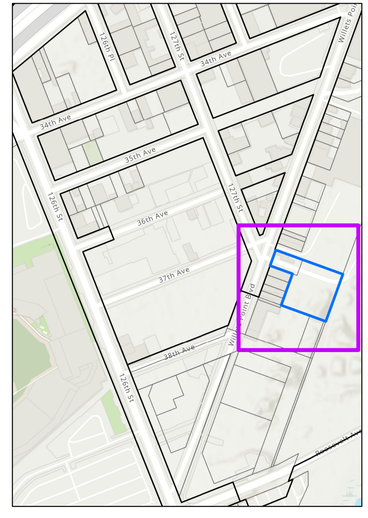
Analyte	NYSDEC SGVs
VOCs	
1,2,4-Trimethylbenzene	5
1,3,5-Trimethylbenzene (Mesitylene)	5
Acetone	50
Acrylonitrile	5
Benzene	1
Dichlorodifluoromethane	5
Ethylbenzene	5
M,P-Xylene	5
n-Propylbenzene	5
o-Xylene (1,2-Dimethylbenzene)	5
Styrene	5
Tert-Butyl Methyl Ether (MTBE)	10
Toluene	5
Total Xylenes	5

Exceedance Summary:

10 - Result exceeds NYSDEC SGVs

Notes:
1. Imagery provided through Langan's subscription to Nearmap.com. Flown on 07/03/2025.
2. Tax parcel data provided by the New York City Department of City Planning, MapPLUTO 23v2, and a survey prepared by Langan, July 28, 2023.
3. BCP - Brownfield Cleanup Program
4. Groundwater sample analytical results are compared to the New York State Department of Environmental Conservation (NYSDEC) Title 6 Codes, Rules, and Regulations (NYCRR) Part 703.5 and the NYSDEC Technical and Operation Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards and Guidance Values for Class GA Water and published addenda (herein collectively referenced as "NYSDEC SGVs").
5. Results are shown in micrograms per liter (µg/l).

Qualifiers:
B - The analyte was found in the associated analysis batch blank.
J - The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample.
UJ - The analyte was not detected at a level greater than or equal to the reporting limit (RL); however, the reported RL is approximate and may be inaccurate or imprecise.
U - The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the RL or the sample concentration for results impacted by blank contamination.



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Project
WILLETS POINT DEVELOPMENT L-PARCEL
BCP SITE NO. C241146H
QUEENS NEW YORK

Figure Title
GROUNDWATER DELINEATION SAMPLE ANALYTICAL RESULTS MAP

Project No. 170197601	Figure. 3
Date 4/8/2026	
Scale 1" = 30 feet	
Drawn By MG	
Submission Date	Figure 3 of 3

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ATTACHMENT A

Monitoring Well Construction and Groundwater Sampling Logs

WELL CONSTRUCTION AND DEVELOPMENT SUMMARY

Well No. J-MW118

PROJECT		PROJECT NO.	
Willets Point Development L-Parcel		170197605	
LOCATION		**ELEVATION AND DATUM**	
Flushing, New York		el. 13.10	NAVD88
DRILLING AGENCY		**DATE STARTED**	**DATE FINISHED**
Eastern Environmental Solutions, Inc.		5/23/2025	5/27/2025
DRILLING EQUIPMENT		**DRILLER**	
Sonic Rig		Tyler Bieler	
SIZE AND TYPE OF BIT		**INSPECTOR**	
3 7/8-inch Roller Bit		Loagan Clements	
BOREHOLE DIAMETER		**TYPE OF WELL (OVERBURDEN / BEDROCK)**	
4 inches		Overburden	
RISER MATERIAL	**DIAMETER**	**TYPE OF BACKFILL MATERIAL**	
PVC	2 inches	No. 2 Sand	
TYPE OF SCREEN	**DIAMETER**	**TYPE OF WELL PACK**	**TYPE OF SEAL MATERIAL**
Prepacked Well Screen	2.5 inches	No. 2 Sand	Bentonite

METHOD OF INSTALLATION

A track-mounted, Geoprobe 8140LS, Sonic drill rig was used to advance the boring to approximately 11 feet below grade surface (bgs). A permanent monitoring well was installed which consisted of 2-inch-diameter, threaded, flush-joint, polyvinyl chloride (PVC) casing, 10-foot-long, No. 10 slot (0.01 inches) well screen, and a solid 2" PVC riser. The well screen was installed from approximately 1 to 11 feet bgs with riser from 1 feet bgs to grade surface. Clean No. 2 sand was used to fill the annulus around the screen up to about 1 ft bgs (the top of the screened interval). A 3-incht-thick bentonite seal was installed above the sand to about 0.75 feet bgs. The monitoring well was finished at the surface with a flush-mounted, H-20 load-rated access cover set in a 3-foot-by-3-foot-by-1-foot concrete pad.

WELL DEVELOPMENT DATA

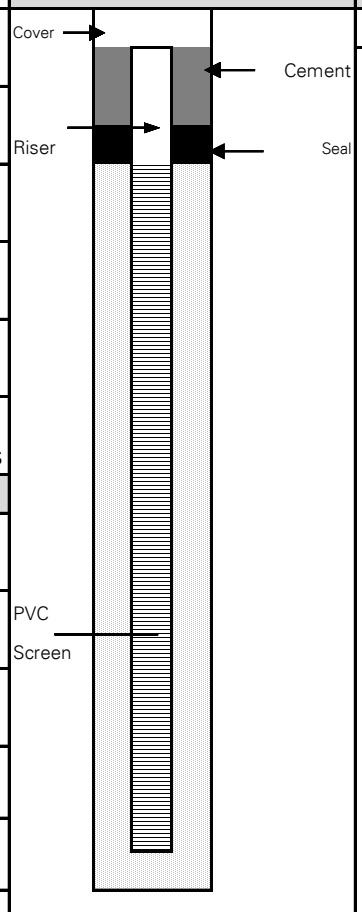
SURGE BLOCK DIAMETER	2 inches	**TYPE PUMP**	Whale Pump	**DEVELOPMENT CONFIRMATION**
DRILLER OR LANGAN	Driller	**MAX PUMP RATE**	2 gal/min	Whale pump passed scross the screend interval until purge water clear on 5/23/2025
NUMBER OF SURGE CYCLES	-	**TOTAL VOLUME**	20 gallons	

TOP OF CASING	ELEVATION	DEPTH (ft)
	13.1	0.0
TOP OF SEAL	**ELEVATION**	**DEPTH (ft)**
	13.1	0.75
TOP OF FILTER	**ELEVATION**	**DEPTH (ft)**
	12.1	1.0
TOP OF SCREEN	**ELEVATION**	**DEPTH (ft)**
		1.0
BOTTOM OF BORING	**ELEVATION**	**DEPTH (ft)**
	2.1	11.0
SCREEN LENGTH		
	3.1	10.0
SLOT SIZE		
		No. 10 Slot; 0.010 Inches

GROUNDWATER ELEVATIONS

ELEVATION	**DATE**	**DEPTH TO WATER**
ELEVATION	**DATE**	**DEPTH TO WATER**
ELEVATION	**DATE**	**DEPTH TO WATER**
ELEVATION	**DATE**	**DEPTH TO WATER**
ELEVATION	**DATE**	**DEPTH TO WATER**
ELEVATION	**DATE**	**DEPTH TO WATER**

WELL DETAILS



SUMMARY SOIL CLASSIFICATION	DEPTH (FT)
	0
	0.75
	1
	11

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WELL CONSTRUCTION AND DEVELOPMENT SUMMARY

Well No. TMW01

PROJECT		PROJECT NO.	
Willets Point Development L-Parcel		170197605	
LOCATION		**ELEVATION AND DATUM**	
Flushing, New York		el. NA	
DRILLING AGENCY		**DATE STARTED**	**DATE FINISHED**
Aquifer Drilling and Testing, Inc.		1/28/2026	1/28/2026
DRILLING EQUIPMENT		**DRILLER**	
Sonic Rig		Tony Palonque	
SIZE AND TYPE OF BIT		**INSPECTOR**	
3 7/8-inch Roller Bit		Olivia O'Donnell	
BOREHOLE DIAMETER		**TYPE OF WELL (OVERBURDEN / BEDROCK)**	
4 inches		Overburden	
RISER MATERIAL	**DIAMETER**	**TYPE OF BACKFILL MATERIAL**	
PVC	2 inches	No. 2 Sand	
TYPE OF SCREEN	**DIAMETER**	**TYPE OF WELL PACK**	**TYPE OF SEAL MATERIAL**
Prepacked Well Screen	2.5 inches	No. 2 Sand	Bentonite

METHOD OF INSTALLATION

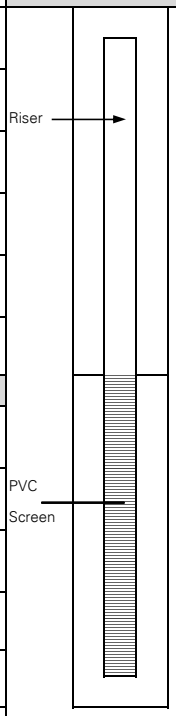
A track-mounted, Fraste XL MAX MRS, Sonic drill rig was used to advance the boring to approximately 17 feet below grade surface (bgs). A temporary monitoring well was installed which consisted of 2-inch-diameter, threaded, flush-joint, polyvinyl chloride (PVC) casing, 10-foot-long, pre-packed 0.01 slot well screen, and a solid 2" PVC riser. The well screen was installed from approximately 7 to 17 feet bgs with riser from 7 feet bgs to grade surface.

	ELEVATION	DEPTH (ft)
TOP OF CASING	N/A	0.0
TOP OF SEAL	N/A	N/A
TOP OF FILTER	N/A	7.0
TOP OF SCREEN	N/A	7.0
BOTTOM OF BORING	N/A	17.0
SCREEN LENGTH		10 feet
SLOT SIZE		No. 10 Slot; 0.010 Inches

GROUNDWATER ELEVATIONS

ELEVATION	DATE	DEPTH TO WATER
	1/28/2026	5.84
	1/29/2026	7.9

WELL DETAILS



SUMMARY SOIL CLASSIFICATION	DEPTH (FT)
	0
	7
	17

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WELL CONSTRUCTION AND DEVELOPMENT SUMMARY

Well No. TMW02

PROJECT		PROJECT NO.	
Willets Point Development L-Parcel		170197605	
LOCATION		**ELEVATION AND DATUM**	
Flushing, New York		el. N/A	
DRILLING AGENCY		**DATE STARTED**	**DATE FINISHED**
Aquifer Drilling and Testing, Inc.		1/28/2026	1/28/2026
DRILLING EQUIPMENT		**DRILLER**	
Sonic Rig		Tony Palonque	
SIZE AND TYPE OF BIT		**INSPECTOR**	
3 7/8-inch Roller Bit		Olivia O'Donnell	
BOREHOLE DIAMETER		**TYPE OF WELL (OVERBURDEN / BEDROCK)**	
4 inches		Overburden	
RISER MATERIAL	**DIAMETER**	**TYPE OF BACKFILL MATERIAL**	
PVC	2 inches	No. 2 Sand	
TYPE OF SCREEN	**DIAMETER**	**TYPE OF WELL PACK**	**TYPE OF SEAL MATERIAL**
Prepacked Well Screen	2.5 inches	No. 2 Sand	Bentonite

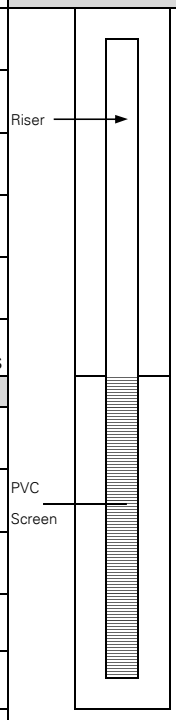
METHOD OF INSTALLATION

A track-mounted, Fraste XL MAX MRS, Sonic drill rig was used to advance the boring to approximately 15 feet below grade surface (bgs). A temporary monitoring well was installed which consisted of 2-inch-diameter, threaded, flush-joint, polyvinyl chloride (PVC) casing, 10-foot-long, pre-packed 0.01 slot well screen, and a solid 2" PVC riser. The well screen was installed from approximately 5 to 15 feet bgs with riser from 5 feet bgs to grade surface.

	ELEVATION	DEPTH (ft)
TOP OF CASING	N/A	0.0
TOP OF SEAL	N/A	N/A
TOP OF FILTER	N/A	5.0
TOP OF SCREEN	N/A	5.0
BOTTOM OF BORING	N/A	15.0
SCREEN LENGTH		10 feet
SLOT SIZE		No. 10 Slot; 0.010 Inches

GROUNDWATER ELEVATIONS

ELEVATION	DATE	DEPTH TO WATER
	1/28/2026	6.92
	1/29/2026	6.23



SUMMARY SOIL CLASSIFICATION	DEPTH (FT)
	0
	5
	15

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WELL CONSTRUCTION AND DEVELOPMENT SUMMARY

Well No. TMW03

PROJECT		PROJECT NO.	
Willets Point Development L-Parcel		170197605	
LOCATION		**ELEVATION AND DATUM**	
Flushing, New York		el. N/A	
DRILLING AGENCY		**DATE STARTED**	**DATE FINISHED**
Aquifer Drilling and Testing, Inc.		1/28/2026	1/28/2026
DRILLING EQUIPMENT		**DRILLER**	
Sonic Rig		Tony Palonque	
SIZE AND TYPE OF BIT		**INSPECTOR**	
3 7/8-inch Roller Bit		Olivia O'Donnell	
BOREHOLE DIAMETER		**TYPE OF WELL (OVERBURDEN / BEDROCK)**	
4 inches		Overburden	
RISER MATERIAL	**DIAMETER**	**TYPE OF BACKFILL MATERIAL**	
PVC	2 inches	No. 2 Sand	
TYPE OF SCREEN	**DIAMETER**	**TYPE OF WELL PACK**	**TYPE OF SEAL MATERIAL**
Prepacked Well Screen	2.5 inches	No. 2 Sand	Bentonite

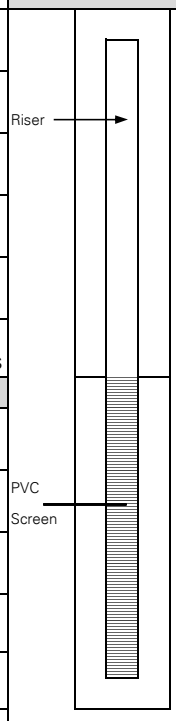
METHOD OF INSTALLATION

A track-mounted, Fraste XL MAX MRS, Sonic drill rig was used to advance the boring to approximately 18 feet below grade surface (bgs). A temporary monitoring well was installed which consisted of 2-inch-diameter, threaded, flush-joint, polyvinyl chloride (PVC) casing, 10-foot-long, pre-packed 0.01 slotwell screen, and a solid 2" PVC riser. The well screen was installed from approximately 8 to 18 feet bgs with riser from 8 feet bgs to grade surface.

TOP OF CASING	ELEVATION	DEPTH (ft)
	N/A	0.0
TOP OF SEAL	**ELEVATION**	**DEPTH (ft)**
	N/A	N/A
TOP OF FILTER	**ELEVATION**	**DEPTH (ft)**
	N/A	8.0
TOP OF SCREEN	**ELEVATION**	**DEPTH (ft)**
	N/A	8.0
BOTTOM OF BORING	**ELEVATION**	**DEPTH (ft)**
	N/A	18.0
SCREEN LENGTH		10 feet
SLOT SIZE		No. 10 Slot; 0.010 Inches

GROUNDWATER ELEVATIONS

ELEVATION	DATE	DEPTH TO WATER
	1/28/2026	6.67
	1/29/2026	6.71



WELL DETAILS	SUMMARY SOIL CLASSIFICATION	DEPTH (FT)
		0
		8
		18

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WELL CONSTRUCTION AND DEVELOPMENT SUMMARY

Well No. TMW04

PROJECT		PROJECT NO.	
Willets Point Development L-Parcel		170197605	
LOCATION		**ELEVATION AND DATUM**	
Flushing, New York		el. N/A	
DRILLING AGENCY		**DATE STARTED**	**DATE FINISHED**
Aquifer Drilling and Testing, Inc.		1/28/2026	1/28/2026
DRILLING EQUIPMENT		**DRILLER**	
Sonic Rig		Tony Palonque	
SIZE AND TYPE OF BIT		**INSPECTOR**	
3 7/8-inch Roller Bit		Olivia O'Donnell	
BOREHOLE DIAMETER		**TYPE OF WELL (OVERBURDEN / BEDROCK)**	
4 inches		Overburden	
RISER MATERIAL	**DIAMETER**	**TYPE OF BACKFILL MATERIAL**	
PVC	2 inches	No. 2 Sand	
TYPE OF SCREEN	**DIAMETER**	**TYPE OF WELL PACK**	**TYPE OF SEAL MATERIAL**
Prepacked Well Screen	2.5 inches	No. 2 Sand	Bentonite

METHOD OF INSTALLATION

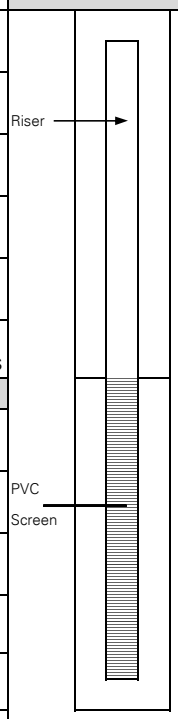
A track-mounted, Fraste XL MAX MRS, Sonic drill rig was used to advance the boring to approximately 16 feet below grade surface (bgs). A temporary monitoring well was installed which consisted of 2-inch-diameter, threaded, flush-joint, polyvinyl chloride (PVC) casing, 10-foot-long, pre-packed 0.01 slot well screen, and a solid 2" PVC riser. The well screen was installed from approximately 6 to 16 feet bgs with riser from 6 feet bgs to grade surface.

	ELEVATION	DEPTH (ft)
TOP OF CASING	N/A	0.0
TOP OF SEAL	N/A	N/A
TOP OF FILTER	N/A	6.0
TOP OF SCREEN	N/A	6.0
BOTTOM OF BORING	N/A	16.0
SCREEN LENGTH		10 feet
SLOT SIZE		No. 10 Slot; 0.010 Inches

GROUNDWATER ELEVATIONS

ELEVATION	DATE	DEPTH TO WATER
	1/28/2026	7.49
	1/29/2026	7.69

WELL DETAILS



SUMMARY SOIL CLASSIFICATION	DEPTH (FT)
	0
	6
	16

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Project Information		Well Information		Equipment Information		Sampling Conditions		Sampling Information	
Project Name:	Willets Point Development L - Parcel	**Well No:**	J-MW118	**Water Quality Device Model:**	Horiba	**Weather:**	9F, Sunny	**Sample(s):**	
Project Number:	170197605	**Well Depth:**	11.00	**Pine Number:**	227736	**Background PID (ppm):**	0.0		J-MW118_013026
Site Location:	Queens, New York	**Well Diameter:**	2-inch	**Pump Make and Model:**	Peristaltic Pump	**PID Beneath Inner Cap (ppm):**	0.3		
Sampling		**Well Screen**	1.00	**Pine Number:**	51238	**Pump Intake Depth:**	9.00	**Sample Date:**	1/30/2026
Personnel:	Olivia O'Donnell	**Interval:**	11.00	**Tubing Diameter*:**	1/4 ID x 3/8 OD	**Depth to Water Before Purge:**	7.96	**Sample Time:**	10:30

STABILIZATION = 3 successive readings within limits

MILLITARY TIME	TEMP °Celsius (+/- 3%)	PH (+/- 0.1)	ORP mV (+/- 10mV)	CONDUCTIVITY mS/cm (+/- 3%)	TURBIDITY NTU (+/- 10% when above 5 NTU)	DO mg/L (+/- 10% when above 0.5 mg/L)	DTW ft Drawdown < 0.33 ft	Flow Rate (L/min) (<0.5 L/min)	Cumulative Discharge Volume (Liters)	NOTES color, odor etc.	Stabilized?
BEGIN PURGING											
9:50	4.89	9.33	-135	2.370	20	1.58	7.96		0.50	clear, colorless, odorless	**N/A**
9:55	6.94	9.54	-149	2.230	14	0.00	7.96	0.05	0.75	clear, colorless, odorless	**N/A**
10:00	8.41	9.67	-162	2.250	6	0.00	7.96	0.05	1.00	clear, colorless, odorless	**N**
10:05	8.94	9.73	-173	2.310	5	0.00	7.96	0.05	1.25	clear, colorless, odorless	**N**
10:10	9.08	9.74	-182	2.320	0	0.00	7.96	0.05	1.50	clear, colorless, odorless	**N**
10:15	9.07	9.71	-182	2.270	0	0.00	7.96	0.05	1.75	clear, colorless, odorless	**Y**

Notes:

1. Well depths, well screen intervals, and groundwater depths measured in feet below the top of well casing, from the northern most point.
2. Well and tubing diameters are measured in inches.
3. PID = Photoionization Detector
4. PPM = Parts per million
5. pH = Hydrogen ion concentration
6. ORP = Oxidation-reduction potential, measured in millivolts (mV)
7. DO = Dissolved Oxygen, measured in milligrams per liter (mg/L)
8. DTW = Depth to water
9. mS/cm = milli-Siemens per centimeter
10. NTU = Nephelometric Turbidity Unit
11. mg/L = milligrams per liter
12. L/min = liters per minute
13. *Bonded tubing (i.e., for bladder pump sampling) only need to report water side OD/ID

Calculated Flow Rate			
Volume (L)	**Time (Min : Sec)**		**Flow Rate (L/min)**
0.591	1	27	0.408

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Project Information		Well Information		Equipment Information		Sampling Conditions		Sampling Information	
Project Name:	Willets Point Development L - Parcel	**Well No:**	TMW01	**Water Quality Device Model:**	Horiba	**Weather:**	11F, clear	**Sample(s):**	
Project Number:	170197605	**Well Depth:**	17-feet bgs	**Pine Number:**	227736	**Background PID (ppm):**	0.0		TMW01_012926
Site Location:	Queens, New York	**Well Diameter:**	2-inch	**Pump Make and Model:**	Peristaltic Pump	**PID Beneath Inner Cap (ppm):**	0.5		
Sampling		**Well Screen**	7.00	**Pine Number:**	51238	**Pump Intake Depth:**	15.00	**Sample Date:**	1/29/2026
Personnel:	Loagan Clements	**Interval:**	17.00	**Tubing Diameter*:**	1/4 ID x 3/8 OD	**Depth to Water Before Purge:**	7.90	**Sample Time:**	10:55

STABILIZATION = 3 successive readings within limits

MILLITARY TIME	TEMP °Celsius (+/- 3%)	PH (+/- 0.1)	ORP mV (+/- 10mV)	CONDUCTIVITY mS/cm (+/- 3%)	TURBIDITY NTU (+/- 10% when above 5 NTU)	DO mg/L (+/- 10% when above 0.5 mg/L)	DTW ft Drawdown < 0.33 ft	Flow Rate (L/min) (<0.5 L/min)	Cumulative Discharge Volume (Liters)	NOTES color, odor etc.	Stabilized?
BEGIN PURGING											
9:20	9.86	10.70	-28	2.140	1000	0.00	8.35		3.50	cloudy, brown, odorless, no sheen	**N/A**
9:25	9.79	10.58	-77	2.220	1000	0.00	8.12	0.15	4.25	cloudy, brown, odorless, no sheen	**N/A**
9:30	9.61	10.50	-109	2.550	1000	0.00	7.92	0.15	5.00	cloudy, brown, odorless, no sheen	**N**
9:35	9.89	10.38	-122	3.080	1000	0.00	7.92	0.15	5.75	cloudy, brown, odorless, no sheen	**N**
9:40	10.03	10.24	-127	3.800	1000	0.00	7.92	0.15	6.50	cloudy, brown, odorless, no sheen	**N**
9:45	9.63	10.08	-124	4.830	785	0.00	7.92	0.15	7.25	clear, tan, odorless, no sheen	**N**
9:50	9.15	9.92	-120	6.090	430	0.00	7.92	0.15	8.00	clear, tan, odorless, no sheen	**N**
9:55	9.97	9.76	-123	6.800	318	0.00	7.92	0.15	8.75	clear, tan, odorless, no sheen	**N**
10:00	9.71	9.67	-133	7.760	200	0.00	7.92	0.15	9.50	clear, tan, odorless, no sheen	**N**
10:05	9.68	9.55	-157	8.660	130	0.00	7.92	0.15	10.25	clear, tan, odorless, no sheen	**N**
10:10	9.74	9.46	-144	9.230	115	0.00	7.92	0.15	11.00	clear, tan, odorless, no sheen	**N**
10:15	9.80	9.45	-179	8.780	117	0.00	7.92	0.15	11.75	clear, tan, odorless, no sheen	**N**
10:20	10.87	9.40	-213	9.060	114	0.00	7.92	0.15	12.50	clear, tan, odorless, no sheen	**N**
10:25	10.67	9.56	-200	10.230	111	0.00	7.92	0.15	13.25	clear, tan, odorless, no sheen	**N**
10:30	10.73	9.50	-225	10.780	100	0.00	7.92	0.15	14.00	clear, tan, odorless, no sheen	**N**
10:35	10.56	9.14	-264	11.100	96	0.00	7.92	0.15	14.75	clear, tan, odorless, no sheen	**N**
10:40	10.97	9.15	-282	11.000	94	0.00	7.92	0.15	15.50	clear, tan, odorless, no sheen	**N**

Notes:

1. Well depths, well screen intervals, and groundwater depths measured in feet below the top of well casing, from the northern most point.
2. Well and tubing diameters are measured in inches.
3. PID = Photoionization Detector
4. PPM = Parts per million
5. pH = Hydrogen ion concentration
6. ORP = Oxidation-reduction potential, measured in millivolts (mV)
7. DO = Dissolved Oxygen, measured in milligrams per liter (mg/L)
8. DTW = Depth to water
9. mS/cm = milli-Siemens per centimeter
10. NTU = Nephelometric Turbidity Unit
11. mg/L = milligrams per liter
12. L/min = liters per minute
13. *Bonded tubing (i.e., for bladder pump sampling) only need to report water side OD/ID

Calculated Flow Rate			
Volume (L)	**Time (Min : Sec)**		**Flow Rate (L/min)**
1.000	4	51	0.206

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Project Information		Well Information		Equipment Information		Sampling Conditions		Sampling Information	
Project Name:	Willets Point Development L - Parcel	**Well No:**	TMW02	**Water Quality Device Model:**	Horiba	**Weather:**	19F, clear	**Sample(s):**	
Project Number:	170197605	**Well Depth:**	15-feet bgs	**Pine Number:**	227736	**Background PID (ppm):**	0.0		TMW02_012926
Site Location:	Queens, New York	**Well Diameter:**	2-inch	**Pump Make and Model:**	Peristaltic Pump	**PID Beneath Inner Cap (ppm):**	3.7		
Sampling		**Well Screen**	5.00	**Pine Number:**	51238	**Pump Intake Depth:**	13.00	**Sample Date:**	1/29/2026
Personnel:	Loagan Clements	**Interval:**	15.00	**Tubing Diameter*:**	1/4 ID x 3/8 OD	**Depth to Water Before Purge:**	6.23	**Sample Time:**	14:22

STABILIZATION = 3 successive readings within limits

MILLITARY TIME	TEMP °Celsius (+/- 3%)	PH (+/- 0.1)	ORP mV (+/- 10mV)	CONDUCTIVITY mS/cm (+/- 3%)	TURBIDITY NTU (+/- 10% when above 5 NTU)	DO mg/L (+/- 10% when above 0.5 mg/L)	DTW ft Drawdown < 0.33 ft	Flow Rate (L/min) (<0.5 L/min)	Cumulative Discharge Volume (Liters)	NOTES color, odor etc.	Stabilized?
BEGIN PURGING											
13:47	9.56	9.99	-58	2.150	537	0.26	6.50		4.25	cloudy, gray, odorless, no sheen	**N/A**
13:52	9.42	9.86	-87	2.140	491	1.96	6.50	0.35	6.00	cloudy, gray, odorless, no sheen	**N/A**
13:57	9.29	9.78	-107	2.160	478	0.99	6.50	0.40	8.00	cloudy, gray, odorless, no sheen	**N**
14:02	9.11	9.79	-121	2.200	435	0.00	6.50	0.25	9.25	cloudy, gray, odorless, no sheen	**N**
14:07	9.06	9.63	-136	2.220	436	0.00	6.50	0.35	11.00	cloudy, gray, odorless, no sheen	**N**
14:12	9.07	9.57	-139	2.220	425	0.00	6.50	0.25	12.25	cloudy, gray, odorless, no sheen	**N**
14:17	9.07	9.54	-142	2.240	424	0.00	6.50	0.15	13.00	cloudy, gray, odorless, no sheen	**Y**

Notes:

1. Well depths, well screen intervals, and groundwater depths measured in feet below the top of well casing, from the northern most point.
2. Well and tubing diameters are measured in inches.
3. PID = Photoionization Detector
4. PPM = Parts per million
5. pH = Hydrogen ion concentration
6. ORP = Oxidation-reduction potential, measured in millivolts (mV)
7. DO = Dissolved Oxygen, measured in milligrams per liter (mg/L)
8. DTW = Depth to water
9. mS/cm = milli-Siemens per centimeter
10. NTU = Nephelometric Turbidity Unit
11. mg/L = milligrams per liter
12. L/min = liters per minute
13. *Bonded tubing (i.e., for bladder pump sampling) only need to report water side OD/ID

Calculated Flow Rate			
Volume (L)	**Time (Min : Sec)**		**Flow Rate (L/min)**
1.000	2	44	0.366

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Project Information		Well Information		Equipment Information		Sampling Conditions		Sampling Information	
Project Name:	Willets Point Development L - Parcel	**Well No:**	TMW03	**Water Quality Device Model:**	Horiba	**Weather:**	14F, clear	**Sample(s):**	
Project Number:	170197605	**Well Depth:**	18-feet bgs	**Pine Number:**	227736	**Background PID (ppm):**	0.0		TMW03_012926
Site Location:	Queens, New York	**Well Diameter:**	2-inch	**Pump Make and Model:**	Peristaltic Pump	**PID Beneath Inner Cap (ppm):**	2.3		
Sampling		**Well Screen**	8.00	**Pine Number:**	51238	**Pump Intake Depth:**	16.00	**Sample Date:**	1/29/2026
Personnel:	Loagan Clements	**Interval:**	18.00	**Tubing Diameter*:**	1/4 ID x 3/8 OD	**Depth to Water Before Purge:**	6.71	**Sample Time:**	12:15

STABILIZATION = 3 successive readings within limits

MILLITARY TIME	TEMP °Celsius (+/- 3%)	PH (+/- 0.1)	ORP mV (+/- 10mV)	CONDUCTIVITY mS/cm (+/- 3%)	TURBIDITY NTU (+/- 10% when above 5 NTU)	DO mg/L (+/- 10% when above 0.5 mg/L)	DTW ft Drawdown < 0.33 ft	Flow Rate (L/min) (<0.5 L/min)	Cumulative Discharge Volume (Liters)	NOTES color, odor etc.	Stabilized?
BEGIN PURGING											
11:18	11.84	9.14	-92	9.150	402	0.00	6.71		3.25	clear,tan, odorless, no sheen	**N/A**
11:23	12.46	9.19	-220	9.100	352	0.00	6.72	0.35	5.00	clear,tan, odorless, no sheen	**N/A**
11:28	12.49	9.16	-252	9.310	424	0.00	6.72	0.25	6.25	clear,tan, odorless, no sheen	**N**
11:33	12.19	9.03	-256	9.580	270	0.00	6.71	0.25	7.50	clear,tan, odorless, no sheen	**N**
11:38	12.13	8.98	-276	9.840	242	0.00	6.72	0.15	8.25	clear,tan, odorless, no sheen	**N**
11:43	12.19	8.97	-282	9.880	166	0.00	6.72	0.20	9.25	clear,tan, odorless, no sheen	**N**
11:48	12.08	8.90	-279	9.990	143	0.00	6.72	0.15	10.00	clear,tan, odorless, no sheen	**N**
11:53	12.07	8.87	-281	10.100	114	0.00	6.72	0.15	10.75	clear,tan, odorless, no sheen	**N**
11:58	12.02	8.91	-286	9.970	99	0.00	6.72	0.25	12.00	clear,tan, odorless, no sheen	**N**
12:03	12.12	8.91	-289	9.930	97	0.00	6.72	0.15	12.75	clear,tan, odorless, no sheen	**N**
12:08	12.09	8.91	-293	9.930	89	0.00	6.71	0.10	13.25	clear,tan, odorless, no sheen	**Y**

Notes:

1. Well depths, well screen intervals, and groundwater depths measured in feet below the top of well casing, from the northern most point.
2. Well and tubing diameters are measured in inches.
3. PID = Photoionization Detector
4. PPM = Parts per million
5. pH = Hydrogen ion concentration
6. ORP = Oxidation-reduction potential, measured in millivolts (mV)
7. DO = Dissolved Oxygen, measured in milligrams per liter (mg/L)
8. DTW = Depth to water
9. mS/cm = milli-Siemens per centimeter
10. NTU = Nephelometric Turbidity Unit
11. mg/L = milligrams per liter
12. L/min = liters per minute
13. *Bonded tubing (i.e., for bladder pump sampling) only need to report water side OD/ID

Calculated Flow Rate			
Volume (L)	**Time (Min : Sec)**		**Flow Rate (L/min)**
1.000	3	9	0.317

Project Information		Well Information		Equipment Information		Sampling Conditions		Sampling Information	
Project Name:	Willets Point Development L - Parcel	**Well No:**	TMW04	**Water Quality Device Model:**	Horiba	**Weather:**	18F, clear	**Sample(s):**	
Project Number:	170197605	**Well Depth:**	16-feet bgs	**Pine Number:**	227736	**Background PID (ppm):**	0.0		TMW04_012926
Site Location:	Queens, New York	**Well Diameter:**	2-inch	**Pump Make and Model:**	Peristaltic Pump	**PID Beneath Inner Cap (ppm):**	11.1		
Sampling		**Well Screen**	6.00	**Pine Number:**	51238	**Pump Intake Depth:**	14.00	**Sample Date:**	1/29/2026
Personnel:	Loagan Clements	**Interval:**	16.00	**Tubing Diameter*:**	1/4 ID x 3/8 OD	**Depth to Water Before Purge:**	7.69	**Sample Time:**	13:18

STABILIZATION = 3 successive readings within limits

MILLITARY TIME	TEMP °Celsius (+/- 3%)	PH (+/- 0.1)	ORP mV (+/- 10mV)	CONDUCTIVITY mS/cm (+/- 3%)	TURBIDITY NTU (+/- 10% when above 5 NTU)	DO mg/L (+/- 10% when above 0.5 mg/L)	DTW ft Drawdown < 0.33 ft	Flow Rate (L/min) (<0.5 L/min)	Cumulative Discharge Volume (Liters)	NOTES color, odor etc.	Stabilized?
BEGIN PURGING											
12:48	11.45	10.68	-205	2.550	248	1.31	7.74		4.75	clear, gray, odorless, no sheen	**N/A**
12:53	11.85	10.71	-241	2.600	355	0.00	7.73	0.45	7.00	clear, gray, odorless, no sheen	**N/A**
12:58	11.94	10.70	-247	2.620	255	0.00	7.73	0.30	8.50	clear, gray, odorless, no sheen	**N**
13:03	11.54	10.66	-251	2.630	255	0.00	7.72	0.15	9.25	clear, gray, odorless, no sheen	**N**
13:08	11.43	10.67	-255	2.640	257	0.00	7.70	0.15	10.00	clear, gray, odorless, no sheen	**N**
13:13	11.46	10.64	-256	2.670	261	0.00	7.71	0.15	10.75	clear, gray, odorless, no sheen	**Y**

Notes:

1. Well depths, well screen intervals, and groundwater depths measured in feet below the top of well casing, from the northern most point.
2. Well and tubing diameters are measured in inches.
3. PID = Photoionization Detector
4. PPM = Parts per million
5. pH = Hydrogen ion concentration
6. ORP = Oxidation-reduction potential, measured in millivolts (mV)
7. DO = Dissolved Oxygen, measured in milligrams per liter (mg/L)
8. DTW = Depth to water
9. mS/cm = milli-Siemens per centimeter
10. NTU = Nephelometric Turbidity Unit
11. mg/L = milligrams per liter
12. L/min = liters per minute
13. *Bonded tubing (i.e., for bladder pump sampling) only need to report water side OD/ID

Calculated Flow Rate			
Volume (L)	**Time (Min : Sec)**		**Flow Rate (L/min)**
1.000	3	31	0.284

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368 Ninth Avenue, 8th Floor, New York, NY 10001

ATTACHMENT B

Soil Boring Logs

LANGAN

Log of Boring TMW01 Project No 170197605

Project: Willets Point Development L-Parcel		Date Started: 1/28/2026	Date Finished: 1/28/2026
Location: Queens, NY		Coordinates: Not Available	
Drilling Contractor: Aquifer Drilling and Testing, Inc.		Elevation and Datum: N/A	
Drilling Method: Sonic		Completion Depth: 20.0 ft	Rock Depth: N/A
Drilling Equipment: Fraste XL MAX MRS Sonic Rig		Water Depth (ft.) First: 12.0	Completion: N/A / 24 Hour: N/A
Casing Diameter (in): N/A	Casing Depth (ft): N/A	Water Elevation (ft.) First: N/A	Completion: N/A / 24 Hour: N/A
Sampler: Sonic Core		Water Reading Date/Time:	N/A / N/A
Sampler Hammer: N/A	Weight (lbs): N/A / Drop (in): N/A	Drilling Foreman: Tony Palomeque	Field Engineer: Olivia ODonnell

Material Symbol	Sample Description	Elev. (ft)	Depth Scale (ft)	Sample Data: Number	Type	Recov. (in)	Penetr-resist BL/6in	PID (ppm)	Remarks
	BALLAST	0.0	0						
	SILTY POORLY GRADED SAND with GRAVEL (FILL) dark brown, dry, fine sand, coarse subangular gravel, metal, glass, construction debris		1	M-1	Sonic	47/57		0.0	Hand tools used to make 6-inch diameter hole through apron.
			2					0.0	
			3					0.0	
			4					0.0	
			5					0.0	
	SILTY POORLY GRADED SAND with GRAVEL (FILL) dark brown, dry, fine poorly graded sand, coarse subangular gravel, metal, glass, construction debris, brick, concrete		6	M-2	Sonic	46/60		79.0	5 to 10 feet - Black staining, sharp upper boundary and no lower boundary, petroleum-like odor, positive sheen test
			7					54.0	
			8					29.6	
			9					10.1	
			10					4.7	
	SILTY POORLY GRADED SAND with GRAVEL (FILL) dark brown, dry, fine poorly graded sand, coarse subangular gravel, metal, glass, construction debris, concrete		11	M-3A	Sonic	45/60		4.9	10 to 12 feet - Black staining, no upper boundary and no lower boundary, petroleum-like odor, positive sheen test
			12					7.8	
			13	M-3B				18.3	
			14					10.7	
			15					13.2	
	SILTY POORLY GRADED SAND with GRAVEL (FILL) dark brown, wet, fine poorly graded sand, coarse subangular gravel, metal, glass, construction debris, concrete		16	M-4A	Sonic	60/60		9.1	
			17					4.3	
			18					3.1	
	FAT CLAY with SAND (CH) dark gray, wet, fine sand, fibrous vegetation		19	M-4B				4.0	
			20					5.0	
	End of Boring at 20.0 ft.		21					3.9	
			22					0.0	
			23					0.0	
			24					0.0	
								0.0	
								0.0	
								0.0	
								0.0	
								0.0	
								0.0	
								0.0	
								0.0	Bottom of boring at 20 feet bgs. Backfilled with No. 2 sand, set 10-ft of 0.010-slot screen at 17 ft.

LANGAN

Log of Boring TMW02 Project No 170197605

Project: Willets Point Development L-Parcel		Date Started: 1/28/2026	Date Finished: 1/28/2026
Location: Queens, NY		Coordinates: Not Available	
Drilling Contractor: Aquifer Drilling and Testing, Inc.		Elevation and Datum: N/A	
Drilling Method: Sonic		Completion Depth: 15.0 ft	Rock Depth: N/A
Drilling Equipment: Fraste XL MAX MRS Sonic Rig		Water Depth (ft.) First: 8.0	Completion: N/A / 24 Hour: N/A
Casing Diameter (in): N/A	Casing Depth (ft): N/A	Water Elevation (ft.) First: N/A	Completion: N/A / 24 Hour: N/A
Sampler: Sonic Core		Water Reading Date/Time:	N/A / N/A
Sampler Hammer: N/A	Weight (lbs): N/A / Drop (in): N/A	Drilling Foreman: Tony Palomeque	Field Engineer: Olivia ODonnell

Material Symbol	Sample Description	Elev. (ft)	Depth Scale (ft)	Sample Data: Number	Type	Recov. (in)	Penetr-resist BL/6in	PID (ppm)	Remarks
	BALLAST	0.0	0					0.0	Hand tools used to make 6-inch diameter hole through apron.
	SILTY GRAVELLY POORLY GRADED SAND (FILL) dark brown, dry, fine sand, fine subangular gravel, brick, construction debris		1					0.0	
			2					0.0	
			3	M-1	Sonic	53/57		0.0	
			4					0.0	
			5					0.0	
	SILTY POORLY GRADED SAND with GRAVEL (FILL) grayish-dark brown, moist, metal, construction debris, concrete, brick, glass		6					0.8	
			7	M-2A	Sonic	55/60		1.2	
			8					2.0	
			9	M-2B				7.0	
			10					4.3	9 to 10 feet - Petroleum-like odor, black staining sharp upper boundary and no lower boundary, positive sheen test
	SILTY GRAVELLY POORLY GRADED SAND (FILL) grayish-dark brown, wet, coarse subangular gravel, metal, construction debris, concrete, brick, glass		11					2.1	
			12					1.3	
			13	M-3	Sonic	36/60		1.1	
			14					0.6	
			15					1.0	
	End of Boring at 15.0 ft.		16					0.0	Bottom of boring at 15 feet bgs. Set 10-ft of 0.010-slot screen at 15 ft.
			17					0.0	
			18					0.0	
			19					0.0	
			20					0.0	
			21					0.0	
			22					0.0	
			23						
			24						

LANGAN

Log of Boring TMW03 Project No 170197605

Project: Willets Point Development L-Parcel		Date Started: 1/28/2026	Date Finished: 1/28/2026
Location: Queens, NY		Coordinates: Not Available	
Drilling Contractor: Aquifer Drilling and Testing, Inc.		Elevation and Datum: N/A	
Drilling Method: Sonic		Completion Depth: 20.0 ft	Rock Depth: N/A
Drilling Equipment: Fraste XL MAX MRS Sonic Rig		Water Depth (ft.) First: 13.0	Completion: N/A / 24 Hour: N/A
Casing Diameter (in): N/A	Casing Depth (ft): N/A	Water Elevation (ft.) First: N/A	Completion: N/A / 24 Hour: N/A
Sampler: Sonic Core		Water Reading Date/Time:	N/A / N/A
Sampler Hammer: N/A	Weight (lbs): N/A / Drop (in): N/A	Drilling Foreman: Tony Palomeque	Field Engineer: Olivia ODonnell

Material Symbol	Sample Description	Elev. (ft)	Depth Scale (ft)	Sample Data: Number	Type	Recov. (in)	Penetr-resist BL/6in	PID (ppm)	Remarks
	BALLAST	0.0	0					0.0	Hand tools used to make 6-inch diameter hole through apron.
	GRAVELLY POORLY GRADED SAND with SILT (FILL) dark brown, moist, fine sand, coarse subangular gravel, construction debris		1	M-1	Sonic	43/57		0.0	
			2					0.0	
			3					0.0	
			4					0.0	
			5					0.0	
	GRAVELLY POORLY GRADED SAND with SILT (FILL) dark brown, moist, fine poorly graded sand, coarse subangular gravel, construction debris, concrete, brick, metal		6	M-2	Sonic	41/60		0.2	
			7					10.8	
			8					24.1	
			9					27.8	
			10					51.3	
	GRAVELLY POORLY GRADED SAND with SILT (FILL) dark brown, moist, fine poorly graded sand, coarse subangular gravel, construction debris, concrete, brick, metal		11	M-3	Sonic	48/60		30.4	
			12					32.1	
			13					0.0	
			14					0.1	
			15					0.2	
	GRAVELLY POORLY GRADED SAND with SILT (FILL) dark brown, wet, fine poorly graded sand, coarse subangular gravel, construction debris, concrete, brick, metal		16	M-4A	Sonic	36/60		0.1	
			17					0.6	12 to 14 feet - Black staining, sharp upper boundary and no lower boundary, petroleum-like odor, positive sheen test
			18	M-4B				1.2	
			19					2.0	
			20					1.3	
	FAT CLAY with SAND (CH) dark , wet, high plasticity, very slow dilatancy clay, fine sand, fibrous vegetation		21					0.0	
			22					0.0	
			23					0.0	
			24					0.0	
	End of Boring at 20.0 ft.								Bottom of boring at 20 feet bgs. Backfilled with cuttings and No. 2 sand, set 10-ft of 0.010-slot screen at 18 ft.

LANGAN

Log of Boring TMW04 Project No 170197605

Project: Willets Point Development L-Parcel		Date Started: 1/28/2026	Date Finished: 1/28/2026
Location: Queens, NY		Coordinates: Not Available	
Drilling Contractor: Aquifer Drilling and Testing, Inc.		Elevation and Datum: N/A	
Drilling Method: Sonic		Completion Depth: 20.0 ft	Rock Depth: N/A
Drilling Equipment: Fraste XL MAX MRS Sonic Rig		Water Depth (ft.) First: 11.0	Completion: N/A / 24 Hour: N/A
Casing Diameter (in): N/A	Casing Depth (ft): N/A	Water Elevation (ft.) First: N/A	Completion: N/A / 24 Hour: N/A
Sampler: Sonic Core		Water Reading Date/Time:	N/A / N/A
Sampler Hammer: N/A	Weight (lbs): N/A / Drop (in): N/A	Drilling Foreman: Tony Palomeque	Field Engineer: Olivia ODonnell

Material Symbol	Sample Description	Elev. (ft)	Depth Scale (ft)	Sample Data: Number	Type	Recov. (in)	Penetr-resist BL/6in	PID (ppm)	Remarks
	BALLAST	0.0	0					0.0	Hand tools used to make 6-inch diameter hole through apron.
	GRAVELLY SILTY POORLY GRADED SAND (FILL) dark brown, moist, fine sand,construction debris		1					0.0	
			2					0.0	
			3	M-1	Sonic	50/57		0.0	
			4					0.0	
			5					0.0	
								5.0	
								7.9	
	GRAVELLY SILTY POORLY GRADED SAND (FILL) dark brown, moist, fine poorly graded sand,construction debris, concrete, brick, glass, metal		6					11.8	
								21.4	
			7					30.2	
				M-2	Sonic	44/60		65.6	
			8					119.1	
								74.0	
			9					70.8	
								164.2	8.50 to 12 feet - Black staining, sharp upper boundary and diffuse lower boundary, petroleum-like odor, positive sheen test
	GRAVELLY SILTY POORLY GRADED SAND (FILL) dark brown, wet, fine poorly graded sand,construction debris, concrete, brick, glass, metal, cobble ▽		10					9.0	
								12.0	
			11					22.6	
								13.9	
			12	M-3	Sonic	36/60		7.0	
								8.5	
			13						
			14						
			15					0.8	
	GRAVELLY SILTY POORLY GRADED SAND (FILL) dark brown, wet, fine poorly graded sand,construction debris, concrete, brick, glass, metal, cobble							0.0	
			16					2.4	
								1.5	
			17					0.0	
				M-4	Sonic	60/60		0.0	
			18					0.0	
								0.0	
			19					0.0	
								0.0	
	End of Boring at 20.0 ft.		20						Bottom of boring at 20 feet bgs. Backfilled with No. 2 sand, set 10-ft of 0.010-slot screen at 16 ft
			21						
			22						
			23						
			24						

LANGAN

Log of Boring TS01 Project No 170197605

Project: Willets Point Development L-Parcel		Date Started: 1/29/2026	Date Finished: 1/29/2026
Location: Queens, NY		Coordinates: Not Available	
Drilling Contractor: Aquifer Drilling and Testing, Inc.		Elevation and Datum: N/A	
Drilling Method: Sonic		Completion Depth: 15.0 ft	Rock Depth: N/A
Drilling Equipment: Fraste XL MAX MRS Sonic Rig		Water Depth (ft.) First: ▽ 7.0	Completion: ▼ N/A / 24 Hour: ▼ N/A
Casing Diameter (in): N/A	Casing Depth (ft): N/A	Water Elevation (ft.) First: ▽ N/A	Completion: ▼ N/A / 24 Hour: ▼ N/A
Sampler: Sonic Core		Water Reading Date/Time:	N/A / N/A
Sampler Hammer: N/A	Weight (lbs): N/A / Drop (in): N/A	Drilling Foreman: Tony Palomeque	Field Engineer: Olivia ODonnell

Material Symbol	Sample Description	Elev. (ft)	Depth Scale (ft)	Sample Data: Number	Type	Recov. (in)	Penetr-resist BL/6in	PID (ppm)	Remarks
	BALLAST	0.0	0					0.0	Hand tools used to make 6-inch diameter hole through apron.
	SILTY GRAVELLY POORLY GRADED SAND (FILL) brown, moist, fine sand, fine subangular gravel, construction debris		1					0.0	
			2					0.0	
			3	M-1	Sonic	56/57		0.0	
			4					0.0	
			5					0.0	
	SILTY GRAVELLY POORLY GRADED SAND (FILL) brown, moist, fine poorly graded sand, fine subangular gravel, construction debris, metal, glass, brick, concrete		6	M-2A	Sonic	59/60		26.6 20.3 35.2	6 to 12 feet - Petroleum-like odor, negative sheen test
	▽		7					43.6 96.3	
			8	M-2B				395.0 120.9	
			9					93.5 80.2	
			10					85.7 27.9	
	SILTY GRAVELLY POORLY GRADED SAND (FILL) brown, wet, fine poorly graded sand, fine subangular gravel, construction debris, metal, glass, brick, concrete		11					21.3 20.6	
			12	M-3	Sonic	48/60		47.7 50.8	TS01_EL_1-3
			13					51.3 32.9	
			14					35.6	
	End of Boring at 15.0 ft.		15						Bottom of boring at 15 feet bgs. Boring backfilled to grade with cuttings and No. 2 sand, and capped with ballast.
			16						
			17						
			18						
			19						
			20						
			21						
			22						
			23						
			24						

LANGAN

Log of Boring **TS02** Project No **170197605**

Project: Willets Point Development L-Parcel		Date Started: 1/29/2026	Date Finished: 1/29/2026
Location: Queens, NY		Coordinates: Not Available	
Drilling Contractor: Aquifer Drilling and Testing, Inc.		Elevation and Datum: N/A	
Drilling Method: Sonic		Completion Depth: 15.0 ft	Rock Depth: N/A
Drilling Equipment: Fraste XL MAX MRS Sonic Rig		Water Depth (ft.) First: ▽ 7.0	Completion: ▼ N/A / 24 Hour: ▼ N/A
Casing Diameter (in): N/A	Casing Depth (ft): N/A	Water Elevation (ft.) First: ▽ N/A	Completion: ▼ N/A / 24 Hour: ▼ N/A
Sampler: Sonic Core		Water Reading Date/Time:	N/A / N/A
Sampler Hammer: N/A	Weight (lbs): N/A / Drop (in): N/A	Drilling Foreman: Tony Palomeque	Field Engineer: Olivia ODonnell

Material Symbol	Sample Description	Elev. (ft)	Depth Scale (ft)	Sample Data: Number	Type	Recov. (in)	Penetr-resist BL/6in	PID (ppm)	Remarks
	BALLAST	0.0	0					0.0	Hand tools used to make 6-inch diameter hole through apron.
	SILTY GRAVELLY POORLY GRADED SAND (FILL) dark brown, fine sand, coarse subangular gravel, construction debris, brick		1					0.0	
			2					0.0	
			3	M-1	Sonic	36/57		0.0	
			4					0.0	
	SILTY GRAVELLY POORLY GRADED SAND (FILL) dark brown, fine poorly graded sand, coarse subangular gravel, construction debris, brick		5					0.0	
			6	M-2A				0.0	
	▽		7					0.1	
	POORLY GRADED GRAVEL with SAND and SILT (FILL) reddish gray, wet, coarse subangular gravel, fine sand		8	M-2B	Sonic	42/60		0.3	
			9					0.8	
			10					0.0	
								0.0	
	POORLY GRADED GRAVEL with SAND and SILT (FILL) reddish gray, wet, coarse subangular poorly graded gravel, fine sand		10	M-3A				6.9	
			11					2.3	10.5 to 12.5 feet - Petroleum-like odor, negative sheen test, PetroFix™ Treatment Interval
	SILTY GRAVELLY POORLY GRADED SAND (FILL) dark brown, wet, fine poorly graded sand, coarse subangular gravel, construction debris, brick		12					5.4	
			13	M-3B	Sonic	36/60		12.3	
			14					10.8	TS01_EL_1-3
			15					102.0	
	End of Boring at 15.0 ft.		16						Bottom of boring at 15 feet bgs. Boring backfilled to grade with cuttings and No. 2 sand, capped with ballast.
			17						
			18						
			19						
			20						
			21						
			22						
			23						
			24						

LANGAN

Log of Boring TS03 Project No 170197605

Project: Willets Point Development L-Parcel		Date Started: 1/29/2026	Date Finished: 1/29/2026
Location: Queens, NY		Coordinates: Not Available	
Drilling Contractor: Aquifer Drilling and Testing, Inc.		Elevation and Datum: N/A	
Drilling Method: Sonic		Completion Depth: 15.0 ft	Rock Depth: N/A
Drilling Equipment: Fraste XL MAX MRS Sonic Rig		Water Depth (ft.) First: ▽ 7.0	Completion: ▼ N/A / 24 Hour: ▼ N/A
Casing Diameter (in): N/A / Casing Depth (ft): N/A		Water Elevation (ft.) First: ▽ N/A	Completion: ▼ N/A / 24 Hour: ▼ N/A
Sampler: Sonic Core		Water Reading Date/Time:	N/A / N/A
Sampler Hammer: N/A / Weight (lbs): N/A / Drop (in): N/A		Drilling Foreman: Tony Palomeque	Field Engineer: Olivia ODonnell

Material Symbol	Sample Description	Elev. (ft)	Depth Scale (ft)	Sample Data: Number	Type	Recov. (in)	Penetr-resist BL/6in	PID (ppm)	Remarks
	BALLAST	0.0	0					0.0	Hand tools used to make 6-inch diameter hole through apron.
	SILTY POORLY GRADED SAND with GRAVEL (FILL) dark brown, moist, fine subangular gravel		1					0.0	
			2					0.0	
			3	M-1	Sonic	32/57		0.0	
			4					0.0	
			5					0.0	
	SILTY POORLY GRADED SAND with GRAVEL (FILL) dark brown, moist, fine subangular gravel, construction debris, brick, glass, metal		6	M-2A				0.0	
			7		Sonic	37/60		0.0	
	SANDY POORLY GRADED GRAVEL with SILT (FILL) gray, wet, coarse subangular gravel, fine sand		8	M-2B				0.0	
			9						TS03_EL_4-6
	SANDY POORLY GRADED GRAVEL with SILT (FILL) gray, dry, coarse subangular poorly graded gravel, fine sand		10	M-3A				6.5	10 to 12 feet - Petroleum-like odor, negative sheen test, PetroFix™ Treatment Interval
			11					4.7	
	SILTY GRAVELLY POORLY GRADED SAND (FILL) dark brown, moist, fine subangular gravel, construction debris		12					10.9	
			13	M-3B	Sonic	39/60		7.7	
			14					30.5	
			15					44.3	
	End of Boring at 15.0 ft.		16					40.2	Bottom of boring at 15 feet bgs. Boring backfilled to grade with cuttings and No. 2 sand, capped with ballast.
			17						
			18						
			19						
			20						
			21						
			22						
			23						
			24						

ATTACHMENT C

Material Specification and Safety Data Sheets

SAFETY DATA SHEET

Creation Date 16-Jun-2009 **Revision Date** 18-Dec-2025 **Revision Number** 11

This safety data sheet was created pursuant to the requirements of: US OSHA Hazard Communication Standard 2024 (29 CFR 1910.1200)

1. Identification

Product Name **Sodium hydroxide**

Cat No. : **BP359-500; BP359-212**

CAS No 1310-73-2
Synonyms Caustic soda

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company
Fisher Scientific Company
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number
CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous according to [US] OSHA (29 CFR 1910.1200, 2024)

Corrosive to metals	Category 1
Skin Corrosion/Irritation	Category 1 A
Serious Eye Damage/Eye Irritation	Category 1
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system.	

Label Elements

Signal Word
Danger

Hazard Statements
May be corrosive to metals
Causes severe skin burns and eye damage

May cause respiratory irritation

Precautionary Statements
Prevention
Do not breathe dust/fume/gas/mist/vapors/spray
Wash face, hands and any exposed skin thoroughly after handling
Wear protective gloves/protective clothing/eye protection/face protection
Use only outdoors or in a well-ventilated area
Keep only in original packaging
Response
Immediately call a POISON CENTER or doctor
Inhalation
IF INHALED: Remove person to fresh air and keep comfortable for breathing
Skin
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower
Take off contaminated clothing and wash before reuse
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
Ingestion
IF SWALLOWED: Rinse mouth. DO NOT induce vomiting
Spills
Absorb spillage to prevent material damage
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Store in corrosive resistant polypropylene container with a resistant inliner
Store in a dry place
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
None identified

Hazards classified under paragraph (d)(1)(ii) of 1910.1200
No information available

3. Composition/information on Ingredients

Component	CAS No	Weight %
Sodium hydroxide	1310-73-2	100

4. First-aid measures

General Advice Immediate medical attention is required. Show this safety data sheet to the doctor in attendance.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Immediate medical attention is required. Keep eye wide open while rinsing.

Skin Contact Wash off immediately with soap and plenty of water while removing all contaminated

clothes and shoes. Call a physician immediately.

Inhalation Remove to fresh air. If breathing is difficult, give oxygen. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Call a physician or poison control center immediately.

Ingestion Do NOT induce vomiting. Immediate medical attention is required. Never give anything by mouth to an unconscious person. Drink plenty of water.

Most important symptoms and effects Causes burns by all exposure routes. . Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Not combustible. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable Extinguishing Media Do not use a solid water stream as it may scatter and spread fire

Flash Point No information available
Method - No information available

Autoignition Temperature No information available

Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
The product causes burns of eyes, skin and mucous membranes. Reacts violently with water. Contact with metals may evolve flammable hydrogen gas.

Hazardous Combustion Products
Hydrogen. Sodium oxides.
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health	Flammability	Instability	Physical hazards
3	0	1	N/A

6. Accidental release measures

Personal Precautions Use personal protective equipment as required. Evacuate personnel to safe areas. Avoid contact with skin, eyes or clothing.

Environmental Precautions Do not allow material to contaminate ground water system. Should not be released into the environment. Do not flush into surface water or sanitary sewer system. See Section 12 for additional Ecological Information.

Methods for Containment and Clean Up Avoid dust formation. Sweep up and shovel into suitable containers for disposal.

7. Handling and Storage

Handling Wear personal protective equipment/face protection. Use only under a chemical fume hood. Do not get in eyes, on skin, or on clothing. Do not breathe dust. Do not ingest. If swallowed then seek immediate medical assistance.

Storage. Keep containers tightly closed in a dry, cool and well-ventilated place. Corrosives area. Incompatible Materials. Strong oxidizing agents. Acids. Metals. Water.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH	Mexico OEL (TWA)
Sodium hydroxide	Ceiling: 2 mg/m³	Ceiling: 2 mg/m³ TWA: 2 mg/m³	IDLH: 10 mg/m³ Ceiling: 2 mg/m³	Ceiling: 2 mg/m³

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH: NIOSH - National Institute for Occupational Safety and Health

Engineering Measures Use only under a chemical fume hood. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166. Tight sealing safety goggles. Face protection shield.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Recommended Filter type: Particulates filter conforming to EN 143.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Appearance

Physical State	Solid
Color	White
Odor	Odorless
Odor Threshold	No information available

Property	Values	Remarks • Method
Melting Point/Range	318 °C / 604.4 °F	
Softening Point	No data available	
Boiling Point/Range	1390 °C / 2534 °F	@ 760 mmHg
Flash Point	No information available	**Method -** No information available
Flammability (liquid)	Not applicable	Solid
Flammability (solid,gas)	Not flammable	
Explosion Limits	No data available	

Autoignition Temperature	No data available
Decomposition Temperature	No data available

pH	14	(5 %)
Viscosity	Not applicable	Solid
Water Solubility	Completely soluble	
Solubility in other solvents	No information available	
Partition Coefficient (n-octanol/water)		
Vapor Pressure	1 mbar @ 700 °C	
Density / Specific Gravity	No data available	
Bulk Density	2.13 g/cm3	
Vapor Density	Not applicable	Solid
Particle characteristics	No data available	

Other Information

Molecular Formula	H Na O
Molecular Weight	40
Explosive Properties	Not explosive
Evaporation Rate	Not applicable - Solid

10. Stability and reactivity

Reactive Hazard Yes

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products. Excess heat.

Incompatible Materials Strong oxidizing agents, Acids, Metals, Water

Hazardous Decomposition Products Hydrogen, Sodium oxides

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Information on expected route of exposure

Inhalation Causes severe burns. May cause pulmonary edema. Harmful by inhalation.

Ingestion Causes severe burns. Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation. Ingestion causes burns of the upper digestive and respiratory tracts. Can burn mouth, throat, and stomach. Harmful if swallowed.

Eyes Causes severe burns. May cause blindness or permanent eye damage. Causes burns. Corrosive to the eyes and may cause severe damage including blindness. Risk of serious damage to eyes.

Skin Causes severe burns. Causes burns.

Toxicology data for the components

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Sodium hydroxide	140 - 340 mg/kg (Rat)	1350 mg/kg (Rabbit)	-

Toxicologically Synergistic Products No information available

(b) skin corrosion/irritation; Category 1 A

(c) serious eye damage/irritation; Category 1

(d) respiratory or skin sensitization;

Respiratory Based on available data, the classification criteria are not met

Skin Based on available data, the classification criteria are not met

(e) germ cell mutagenicity; Based on available data, the classification criteria are not met

(f) carcinogenicity; Based on available data, the classification criteria are not met

The table below indicates whether each agency has listed any ingredient as a carcinogen

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
Sodium hydroxide	1310-73-2	Not listed	Not listed	Not listed	Not listed	Not listed

(g) reproductive toxicity; Based on available data, the classification criteria are not met

(h) STOT-single exposure; Based on available data, the classification criteria are not met

(i) STOT-repeated exposure; Based on available data, the classification criteria are not met

Target Organs None known.

(j) aspiration hazard; Not applicable
Solid

Symptoms / effects,both acute and delayed Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated. Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation.

Other Adverse Effects The toxicological properties have not been fully investigated.

Endocrine Disrupting Properties This product does not contain any known or suspected endocrine disruptors.

12. Ecological information

Ecotoxicity

Do not empty into drains. Large amounts will affect pH and harm aquatic organisms.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Sodium hydroxide	Not listed	LC50 = 45.4 mg/L, 96h static (Oncorhynchus mykiss)	Not listed	Not listed

Persistence and Degradability Soluble in water Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its water solubility.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No	UN1823
Proper Shipping Name	SODIUM HYDROXIDE, SOLID
Hazard Class	8
Packing Group	II

TDG

UN-No	UN1823
Proper Shipping Name	SODIUM HYDROXIDE, SOLID
Hazard Class	8
Packing Group	II

IATA

UN-No	UN1823
Proper Shipping Name	Sodium hydroxide, solid
Hazard Class	8
Packing Group	II

IMDG/IMO

UN-No	UN1823
Proper Shipping Name	Sodium hydroxide, solid
Hazard Class	8
Packing Group	II

15. Regulatory Information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	TSCA - EPA Regulatory Flags
Sodium hydroxide	1310-73-2	X	ACTIVE	-

Legend:
TSCA US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA - Per 40 CFR 751, Regulation of Certain Chemical Substances & Mixtures, Under TSCA Section 6(h) (PBT) Not applicable

TSCA 12(b) - Notices of Export Not applicable

International Inventories
Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), China (IECSC), Korea (KECL).

Component	CAS No	DSL	NDSL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
Sodium hydroxide	1310-73-2	X	-	215-185-5	X	X	X	X	X	KE-31487

KECL - NIER number or KE number (http://ncis.nier.go.kr/en/main.do)

U.S. Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

SARA 311/312 Hazard Categories
Should this product meet EPCRA 311/312 Tier reporting criteria at 40 CFR 370, refer to Section 2 of this SDS for appropriate classifications.

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Sodium hydroxide	X	1000 lb	-	-

Clean Air Act Not applicable

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355).

Component	Hazardous Substances RQs	CERCLA Extremely Hazardous Substances RQs	SARA Reportable Quantity (RQ)
Sodium hydroxide	1000 lb	-	1000 lb 454 kg

California Proposition 65 This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Sodium hydroxide	X	X	X	-	X

U.S. Department of Transportation
Reportable Quantity (RQ): Y
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Authorisation/Restrictions according to EU REACH

Component	CAS No	REACH (1907/2006) - Annex XIV - Substances Subject to Authorization	REACH (1907/2006) - Annex XVII - Restrictions on Certain Dangerous Substances	REACH Regulation (EC 1907/2006) article 59 - Candidate List of Substances of Very High Concern (SVHC)
Sodium hydroxide	1310-73-2	-	Use restricted. See entry 75. (see link for restriction details)	-

REACH links
https://echa.europa.eu/substances-restricted-under-reach

Safety, health and environmental regulations/legislation specific for the substance or mixture

Component	CAS No	OECD HPV	Persistent Organic	Ozone Depletion	Restriction of

			Pollutant	Potential	Hazardous Substances (RoHS)
Sodium hydroxide	1310-73-2	Listed	Not applicable	Not applicable	Not applicable

Contains component(s) that meet a 'definition' of per & poly fluoroalkyl substance (PFAS)?
Not applicable

Other International Regulations

Component	CAS No	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)
Sodium hydroxide	1310-73-2	Not applicable	Not applicable	Not applicable	Annex I - Y35

16. Other Information

Prepared By
Product stewardship (Regulatory Affairs)
Thermo Fisher Scientific
email - begel.sdsdesk@thermofisher.com

Creation Date 16-Jun-2009
Revision Date 18-Dec-2025
Print Date 18-Dec-2025
Revision Summary Updated to the U.S. Department of Labor's Occupational Safety and Health Administration (OSHA) which published its Final Rule in the Federal Register revising the Hazard Communication Standard (HCS/HazCom), 29 CFR 1910.1200 (2024) (HCS §1910.1200, 2024), May 20, 2024, effective July 19, 2024.

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

SAFETY DATA SHEET

Creation Date 24-Nov-2010 **Revision Date** 18-Dec-2025 **Revision Number** 9

This safety data sheet was created pursuant to the requirements of: US OSHA Hazard Communication Standard 2024 (29 CFR 1910.1200)

1. Identification

Product Name **DL-Lactic acid**

Cat No. : **A159-500**

Synonyms DL-2-Hydroxypropanoic acid

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company
Fisher Scientific Company
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number
CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous according to [US] OSHA (29 CFR 1910.1200, 2024)

Skin Corrosion/Irritation	Category 1 C
Serious Eye Damage/Eye Irritation	Category 1

Label Elements

Signal Word
Danger

Hazard Statements
Causes severe skin burns and eye damage

Precautionary Statements
Prevention
Do not breathe dust/fume/gas/mist/vapors/spray
Wash face, hands and any exposed skin thoroughly after handling
Wear protective gloves/protective clothing/eye protection/face protection
Use only outdoors or in a well-ventilated area
Wear respiratory protection
Response
Immediately call a POISON CENTER or doctor
Inhalation
IF INHALED: Remove person to fresh air and keep comfortable for breathing
Immediately call a POISON CENTER or doctor
Skin
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower
Take off contaminated clothing and wash before reuse
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
Ingestion
IF SWALLOWED: Rinse mouth. DO NOT induce vomiting
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Corrosive to the respiratory tract

Hazards classified under paragraph (d)(1)(ii) of 1910.1200
No information available

3. Composition/information on Ingredients

Component	CAS No	Weight %
Lactic acid	50-21-5	80 - 90
Water	7732-18-5	10 - 20

4. First-aid measures

General Advice Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Immediate medical attention is required.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Remove and wash contaminated clothing and gloves, including the inside, before re-use. Call a physician immediately.

Inhalation If not breathing, give artificial respiration. Remove from exposure, lie down. Do not use

	mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Call a physician immediately.
Ingestion	Do NOT induce vomiting. Clean mouth with water. Never give anything by mouth to an unconscious person. Call a physician immediately.
Most important symptoms and effects	Causes burns by all exposure routes. Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	CO_2, dry chemical, dry sand, alcohol-resistant foam.
Unsuitable Extinguishing Media	No information available
Flash Point	110 °C / 230 °F
Method -	No information available
Autoignition Temperature	No information available
Explosion Limits	
Upper	No data available
Lower	No data available
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical
Thermal decomposition can lead to release of irritating gases and vapors. The product causes burns of eyes, skin and mucous membranes.

Hazardous Combustion Products
Carbon monoxide (CO). Carbon dioxide (CO_2).
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health	Flammability	Instability	Physical hazards
3	1	1	N/A

6. Accidental release measures

Personal Precautions	Ensure adequate ventilation. Use personal protective equipment as required. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak.
Environmental Precautions	Should not be released into the environment.
Methods for Containment and Clean Up	Keep in suitable, closed containers for disposal. Soak up with inert absorbent material.

7. Handling and Storage

Handling	Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Use only under a chemical fume hood. Do not breathe mist/vapors/spray. Do not ingest. If swallowed then seek immediate medical assistance.
Storage.	Keep containers tightly closed in a dry, cool and well-ventilated place. Corrosives area.

Incompatible Materials. Acids. Bases. Strong oxidizing agents. Reducing Agent.

8. Exposure controls / personal protection

Exposure Guidelines This product does not contain any hazardous materials with occupational exposure limitsestablished by the region specific regulatory bodies.

Engineering Measures Use only under a chemical fume hood. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Tight sealing safety goggles. Face protection shield.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Recommended Filter type: Organic gases and vapours filter. Type A. Brown. conforming to EN14387.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Appearance

Physical State	Very viscous Liquid	
Color	No information available	
Odor	pungent	
Odor Threshold	No information available	
Property	**Values**	**Remarks • Method**
Melting Point/Range	18 °C / 64.4 °F	
Softening Point	No data available	
Boiling Point/Range	122 °C / 251.6 °F	@ 15 mmHg
Flash Point	110 °C / 230 °F	**Method -** No information available
Flammability (liquid)	No data available	
Flammability (solid,gas)	Not applicable	Liquid
Explosion Limits	No data available	
Autoignition Temperature	No data available	
Decomposition Temperature	No data available	
pH	No information available	
Viscosity	No data available	
Water Solubility	Soluble	
Solubility in other solvents	No information available	

Partition Coefficient (n-octanol/water)

Component	**log Pow**
Lactic acid	-0.54

Vapor Pressure	No data available	
Density / Specific Gravity	1.200	
Bulk Density	Not applicable	Liquid
Vapor Density	No data available	(Air = 1.0)
Particle characteristics	Not applicable (liquid)	

Other Information

Molecular Weight	90.08

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Excess heat. Incompatible products.

Incompatible Materials Acids, Bases, Strong oxidizing agents, Reducing Agent

Hazardous Decomposition Products Carbon monoxide (CO), Carbon dioxide (CO_2)

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Information on expected route of exposure

Inhalation Not an expected route of exposure.
Ingestion May be harmful if swallowed.
Eyes Avoid contact with eyes. Corrosive to the eyes and may cause severe damage including blindness.
Skin Avoid contact with skin. Causes burns. Skin Corrosion/Irritation.

Toxicology data for the components

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Lactic acid	LD50 = 3543 mg/kg (Rat)	>2 g/kg (Rabbit)	LC50 > 7.94 mg/L (Rat) 4 h
Water	-	-	-

Toxicologically Synergistic Products No information available

(b) skin corrosion/irritation; Category 1 C

(c) serious eye damage/irritation; Category 1

(d) respiratory or skin sensitization;
Respiratory No data available
Skin No data available

(e) germ cell mutagenicity; No data available

(f) carcinogenicity;

The table below indicates whether each agency has listed any ingredient as a carcinogen

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
Lactic acid	50-21-5	Not listed	Not listed	Not listed	Not listed	Not listed
Water	7732-18-5	Not listed	Not listed	Not listed	Not listed	Not listed

(g) reproductive toxicity; No data available

(h) STOT-single exposure; No data available

(i) STOT-repeated exposure; No data available

Target Organs None known.

(j) aspiration hazard; No data available

Other Adverse Effects The toxicological properties have not been fully investigated.

Symptoms / effects,both acute and delayed Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated. Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation.

Other Adverse Effects The toxicological properties have not been fully investigated.

Endocrine Disrupting Properties This product does not contain any known or suspected endocrine disruptors.

12. Ecological information

Ecotoxicity

Do not empty into drains.

Persistence and Degradability Persistence is unlikely

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its water solubility.

Component	log Pow
Lactic acid	-0.54

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No UN3265
Proper Shipping Name CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.
Technical Shipping Name DL-Lactic acid
Hazard Class 8
Packing Group III

TDG

UN-No UN3265
Proper Shipping Name CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.
Technical Shipping Name DL-Lactic acid
Hazard Class 8
Packing Group III

IATA

UN-No UN3265
Proper Shipping Name CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.
Technical Shipping Name DL-Lactic acid

Hazard Class	8
Packing Group	III

IMDG/IMO

UN-No	UN3265
Proper Shipping Name	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.
Technical Shipping Name	DL-Lactic acid
Hazard Class	8
Packing Group	III

15. Regulatory Information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	TSCA - EPA Regulatory Flags
Lactic acid	50-21-5	X	ACTIVE	-
Water	7732-18-5	X	ACTIVE	-

Legend:
TSCA US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA - Per 40 CFR 751, Regulation of Certain Chemical Substances & Mixtures, Under TSCA Section 6(h) (PBT) Not applicable

TSCA 12(b) - Notices of Export Not applicable

International Inventories
China, X = listed, Australia, U.S.A. (TSCA), Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Australia (AICS), Korea (KECL), China (IECSC), Japan (ENCS), Philippines (PICCS), Taiwan (TCSI), Japan (ISHL), New Zealand (NZIoC), Japan (ISHL).

Component	CAS No	DSL	NDSL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
Lactic acid	50-21-5	X	-	200-018-0	X	X	X	X	X	KE-21802
Water	7732-18-5	X	-	231-791-2	X	X		X	X	KE-35400

KECL - NIER number or KE number (http://ncis.nier.go.kr/en/main.do)

U.S. Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

SARA 311/312 Hazard Categories
Should this product meet EPCRA 311/312 Tier reporting criteria at 40 CFR 370, refer to Section 2 of this SDS for appropriate classifications.

CWA (Clean Water Act) Not applicable

Clean Air Act Not applicable

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA
This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level

pertaining to releases of this material.

California Proposition 65 This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Water	-	-	X	-	-

U.S. Department of Transportation
Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade Slight risk, Grade 1

Authorisation/Restrictions according to EU REACH Not applicable

Component	CAS No	REACH (1907/2006) - Annex XIV - Substances Subject to Authorization	REACH (1907/2006) - Annex XVII - Restrictions on Certain Dangerous Substances	REACH Regulation (EC 1907/2006) article 59 - Candidate List of Substances of Very High Concern (SVHC)
Lactic acid	50-21-5	-	-	-
Water	7732-18-5	-	-	-

Safety, health and environmental regulations/legislation specific for the substance or mixture

Component	CAS No	OECD HPV	Persistent Organic Pollutant	Ozone Depletion Potential	Restriction of Hazardous Substances (RoHS)
Lactic acid	50-21-5	Listed	Not applicable	Not applicable	Not applicable
Water	7732-18-5	Listed	Not applicable	Not applicable	Not applicable

Contains component(s) that meet a 'definition' of per & poly fluoroalkyl substance (PFAS)?
Not applicable

Other International Regulations

Component	CAS No	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)
Lactic acid	50-21-5	Not applicable	Not applicable	Not applicable	Annex I - Y34
Water	7732-18-5	Not applicable	Not applicable	Not applicable	Not applicable

16. Other Information

Prepared By Product stewardship (Regulatory Affairs)

Thermo Fisher Scientific
email - begel.sdsdesk@thermofisher.com

Creation Date	24-Nov-2010
Revision Date	18-Dec-2025
Print Date	18-Dec-2025
Revision Summary	Updated to the U.S. Department of Labor's Occupational Safety and Health Administration (OSHA) which published its Final Rule in the Federal Register revising the Hazard Communication Standard (HCS/HazCom), 29 CFR 1910.1200 (2024) (HCS §1910.1200, 2024), May 20, 2024, effective July 19, 2024.

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

SAFETY DATA SHEET

Creation Date 05-May-2009 **Revision Date** 19-Dec-2025 **Revision Number** 7

This safety data sheet was created pursuant to the requirements of: US OSHA Hazard Communication Standard 2024 (29 CFR 1910.1200)

1. Identification

Product Name **Acetic acid**

Cat No. : **AC423220000; AC423220025; AC423220100; AC423225000**

CAS No 64-19-7
Synonyms Ethanoic acid; Glacial acetic acid; Methanecarboxylic acid

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company
Fisher Scientific Company
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-227-6701 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No. **US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous according to [US] OSHA (29 CFR 1910.1200, 2024)

Flammable liquids	Category 3
Skin Corrosion/Irritation	Category 1 A
Serious Eye Damage/Eye Irritation	Category 1

Label Elements

Signal Word
Danger

Hazard Statements
Flammable liquid and vapor
Causes severe skin burns and eye damage

Precautionary Statements
Prevention
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking
Wear protective gloves/protective clothing/eye protection/face protection
Do not breathe dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Wash face, hands and any exposed skin thoroughly after handling
Keep container tightly closed
Take action to prevent static discharges
Response
Immediately call a POISON CENTER or doctor
Inhalation
IF INHALED: Remove person to fresh air and keep comfortable for breathing
Skin
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower
Take off contaminated clothing and wash before reuse
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
Ingestion
IF SWALLOWED: Rinse mouth. DO NOT induce vomiting
Fire
In case of fire: Use CO2, dry chemical, or foam to extinguish
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
None identified

Hazards classified under paragraph (d)(1)(ii) of 1910.1200
No information available

3. Composition/information on Ingredients

Component	CAS No	Weight %
Acetic acid	64-19-7	<=100

4. First-aid measures

General Advice Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Immediate medical attention is required.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Remove and wash contaminated clothing and gloves, including the inside, before re-use. Call a physician

immediately.

Inhalation If not breathing, give artificial respiration. Remove from exposure, lie down. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Call a physician immediately.

Ingestion Do NOT induce vomiting. Clean mouth with water. Never give anything by mouth to an unconscious person. Call a physician immediately.

Most important symptoms and effects Causes burns by all exposure routes. Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation: Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media CO_2, dry chemical, dry sand, alcohol-resistant foam.

Unsuitable Extinguishing Media No information available

Flash Point 40 °C / 104 °F

Method - No information available

Autoignition Temperature 427 °C / 800.6 °F

Explosion Limits

Upper	19.9 vol %
Lower	4.0 vol %
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical
Thermal decomposition can lead to release of irritating gases and vapors. The product causes burns of eyes, skin and mucous membranes.

Hazardous Combustion Products
Carbon monoxide (CO). Carbon dioxide (CO_2). Thermal decomposition can lead to release of irritating gases and vapors.
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health	Flammability	Instability	Physical hazards
3	2	0	N/A

6. Accidental release measures

Personal Precautions Use personal protective equipment as required. Ensure adequate ventilation. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak.

Environmental Precautions Should not be released into the environment.

Methods for Containment and Clean Up Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

7. Handling and Storage

Handling Do not get in eyes, on skin, or on clothing. Wear personal protective equipment/face protection. Use only under a chemical fume hood. Do not breathe mist/vapors/spray. Do not

ingest. If swallowed then seek immediate medical assistance.

Storage. Corrosives area. Keep away from heat, sparks and flame. Keep containers tightly closed in a dry, cool and well-ventilated place. Incompatible Materials. Strong oxidizing agents. Strong bases. Metals.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH	Mexico OEL (TWA)
Acetic acid	TWA: 10 ppm STEL: 15 ppm	(Vacated) TWA: 10 ppm (Vacated) TWA: 25 mg/m³ TWA: 10 ppm TWA: 25 mg/m³	IDLH: 50 ppm REL = 10 ppm (TWA) REL = 25 mg/m³ (TWA) STEL: 15 ppm STEL: 37 mg/m³	TWA: 10 ppm STEL: 15 ppm

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH: NIOSH - National Institute for Occupational Safety and Health

Engineering Measures Use only under a chemical fume hood. Use explosion-proof electrical/ventilating/lighting equipment. Ensure that eyewash stations and safety showers are close to the workstation location. Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166. Tight sealing safety goggles. Face protection shield.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Recommended Filter type: Particulates filter conforming to EN 143. Acid gases filter. Type E. Yellow. conforming to EN14387.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Appearance

Physical State	Liquid		
Color	Colorless		
Odor	vinegar-like		
Odor Threshold	No information available		
Property	**Values**	**Remarks**	**• Method**
Melting Point/Range	16 - 16.5 °C / 60.8 - 61.7 °F		
Softening Point	No data available		
Boiling Point/Range	117 - 118 °C / 242.6 - 244.4 °F		
Flash Point	40 °C / 104 °F	**Method -** No information available	
Flammability (liquid)	Flammable	On basis of test data	
Flammability (solid,gas)	Not applicable	Liquid	
Explosion Limits	**Lower** 4 vol%		

	Upper 19.9 vol%	
Autoignition Temperature	427 °C / 800.6 °F	
Decomposition Temperature	No data available	
pH	< 2.5	10 g/L aq.sol
Viscosity	1.53 mPa.s @ 25 °C	
Water Solubility	Miscible	
Solubility in other solvents	No information available	
Partition Coefficient (n-octanol/water)		
Component	**log Pow**	
Acetic acid	-0.2	
Vapor Pressure	1.52 kPa @ 20 °C	
Density / Specific Gravity	1.048	
Bulk Density	Not applicable	Liquid
Vapor Density	2.10	(Air = 1.0)
Particle characteristics	Not applicable (liquid)	

Other Information

Molecular Formula	C2 H4 O2
Molecular Weight	60.05
Explosive Properties	explosive air/vapour mixtures possible
Evaporation Rate	0.97 (Butyl Acetate = 1.0)

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products. Excess heat. Keep away from open flames, hot surfaces and sources of ignition.

Incompatible Materials Strong oxidizing agents, Strong bases, Metals

Hazardous Decomposition Products Carbon monoxide (CO), Carbon dioxide (CO_2), Thermal decomposition can lead to release of irritating gases and vapors

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Information on expected route of exposure

Inhalation Causes severe burns. May be harmful if inhaled.

Ingestion Causes severe burns. Ingestion causes burns of the upper digestive and respiratory tracts. Can burn mouth, throat, and stomach. May be harmful if swallowed.

Eyes Risk of serious damage to eyes. May cause blindness or permanent eye damage. Corrosive to the eyes and may cause severe damage including blindness.

Skin Causes severe burns. May be harmful in contact with skin.

Toxicology data for the components

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Acetic acid	3310 mg/kg (Rat)	-	> 40 mg/L (Rat) 4 h

Toxicologically Synergistic Products No information available

(b) skin corrosion/irritation; No data available

(c) serious eye damage/irritation; No data available

(d) respiratory or skin sensitization;
Respiratory No data available
Skin No data available

(e) germ cell mutagenicity; No data available

Not mutagenic in AMES Test

(f) carcinogenicity;

The table below indicates whether each agency has listed any ingredient as a carcinogen

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
Acetic acid	64-19-7	Not listed	Not listed	Not listed	Not listed	Not listed

(g) reproductive toxicity; No data available

(h) STOT-single exposure; No data available

(i) STOT-repeated exposure; No data available

Target Organs No information available.

(j) aspiration hazard; Based on available data, the classification criteria are not met

Symptoms / effects,both acute and delayed Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.

Other Adverse Effects The toxicological properties have not been fully investigated.

Endocrine Disrupting Properties This product does not contain any known or suspected endocrine disruptors.

12. Ecological information

Ecotoxicity
Do not empty into drains.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Acetic acid	-	Pimephales promelas: LC50 = 88 mg/L/96h Lepomis macrochirus: LC50 = 75 mg/L/96h	Photobacterium phosphoreum: EC50 = 8.8 mg/L/15 min Photobacterium phosphoreum: EC50 = 8.8 mg/L/25 min Photobacterium phosphoreum: EC50 = 8.8 mg/L/5 min	EC50 = 95 mg/L/24h

Persistence and Degradability Miscible with water Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its water solubility.

Component	log Pow
Acetic acid	-0.2

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No UN2789
Proper Shipping Name ACETIC ACID, GLACIAL
Hazard Class 8
Subsidiary Hazard Class 3
Packing Group II

TDG

UN-No UN2789
Proper Shipping Name ACETIC ACID, GLACIAL
Hazard Class 8
Subsidiary Hazard Class 3
Packing Group II

IATA

UN-No UN2789
Proper Shipping Name ACETIC ACID, GLACIAL
Hazard Class 8
Subsidiary Hazard Class 3
Packing Group II

IMDG/IMO

UN-No UN2789
Proper Shipping Name ACETIC ACID, GLACIAL
Hazard Class 8
Subsidiary Hazard Class 3
Packing Group II

15. Regulatory Information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	TSCA - EPA Regulatory Flags
Acetic acid	64-19-7	X	ACTIVE	-

Legend:
TSCA US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA - Per 40 CFR 751, Regulation of Certain Chemical Substances & Mixtures, Under TSCA Section 6(h) (PBT) Not applicable

TSCA 12(b) - Notices of Export Not applicable

International Inventories
Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), China (IECSC), Korea (KECL).

Component	CAS No	DSL	NDSL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
Acetic acid	64-19-7	X	-	200-580-7	X	X	X	X	X	X

KECL - NIER number or KE number (http://ncis.nier.go.kr/en/main.do)

U.S. Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

SARA 311/312 Hazard Categories
Should this product meet EPCRA 311/312 Tier reporting criteria at 40 CFR 370, refer to Section 2 of this SDS for appropriate classifications.

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Acetic acid	X	5000 lb	-	-

Clean Air Act Not applicable

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355).

Component	Hazardous Substances RQs	CERCLA Extremely Hazardous Substances RQs	SARA Reportable Quantity (RQ)
Acetic acid	5000 lb	-	5000 lb 2270 kg

California Proposition 65 This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Acetic acid	X	X	X	-	X

U.S. Department of Transportation
Reportable Quantity (RQ): Y
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade Moderate risk, Grade 2

Authorisation/Restrictions according to EU REACH

Component	CAS No	REACH (1907/2006) -	REACH (1907/2006) -	REACH Regulation (EC

		Annex XIV - Substances Subject to Authorization	Annex XVII - Restrictions on Certain Dangerous Substances	1907/2006) article 59 - Candidate List of Substances of Very High Concern (SVHC)
Acetic acid	64-19-7	-	Use restricted. See entry 75. (see link for restriction details)	-

REACH links
https://echa.europa.eu/substances-restricted-under-reach

Safety, health and environmental regulations/legislation specific for the substance or mixture

Component	CAS No	OECD HPV	Persistent Organic Pollutant	Ozone Depletion Potential	Restriction of Hazardous Substances (RoHS)
Acetic acid	64-19-7	Listed	Not applicable	Not applicable	Not applicable

Contains component(s) that meet a 'definition' of per & poly fluoroalkyl substance (PFAS)?
Not applicable

Other International Regulations

Component	CAS No	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)
Acetic acid	64-19-7	Not applicable	Not applicable	Not applicable	Annex I - Y34

16. Other Information

Prepared By
Product stewardship (Regulatory Affairs)
Thermo Fisher Scientific
email - begel.sdsdesk@thermofisher.com

Creation Date 05-May-2009
Revision Date 19-Dec-2025
Print Date 19-Dec-2025
Revision Summary Updated to the U.S. Department of Labor's Occupational Safety and Health Administration (OSHA) which published its Final Rule in the Federal Register revising the Hazard Communication Standard (HCS/HazCom), 29 CFR 1910.1200 (2024) (HCS §1910.1200, 2024), May 20, 2024, effective July 19, 2024.

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

SAFETY DATA SHEET
Klozur ® KP

SDS # : 7727-21-1-12
Revision date: 2018-07-13
Format: NA
Version 1.01

1. PRODUCT AND COMPANY IDENTIFICATION

Product Identifier

Product Name Klozur ® KP

CAS-No 7727-21-1

Synonyms Potassium Peroxydisulfate; Dipotassium Peroxydisulfate; Peroxydisulfuric acid, dipotassium salt; Peroxydisulfuric acid, potassium salt.

Recommended use of the chemical and restrictions on use

Recommended Use: In situ and ex situ chemical oxidation of contaminants and compounds of concern for environmental remediation applications

Restrictions on Use No uses to be advised against were identified.

Manufacturer/Supplier

PeroxyChem LLC
2005 Market Street
Suite 3200
Philadelphia, PA 19103
Phone: +1 267/ 422-2400 (General Information)
E-Mail: sdsinfo@peroxychem.com

Emergency telephone numbers

For leak, fire, spill or accident emergencies, call:
1 800 / 424 9300 (CHEMTREC - U.S.A.)
1 703 / 527 3887 (CHEMTREC - Collect - All Other Countries)
4001 - 204937 (CHEMTREC - PRC)
1 303/ 389-1409 (Medical - U.S. - Call Collect)

2. HAZARDS IDENTIFICATION

Classification

OSHA Regulatory Status
This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute toxicity - Oral	Category 4
Skin corrosion/irritation	Category 2
Serious eye damage/eye irritation	Category 2B
Respiratory sensitization	Category 1
Skin sensitization	Category 1
Specific target organ toxicity (single exposure)	Category 3
Oxidizing Solids	Category 3

GHS Label elements, including precautionary statements

EMERGENCY OVERVIEW

Danger

Hazard Statements
H334 - May cause allergy or asthma symptoms or breathing difficulties if inhaled
H335 - May cause respiratory irritation
H320 - Causes eye irritation
H315 - Causes skin irritation
H317 - May cause an allergic skin reaction
H302 - Harmful if swallowed
H272 - May intensify fire; oxidizer

Precautionary Statements - Prevention
P261 - Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray
P285 - In case of inadequate ventilation wear respiratory protection
P271 - Use only outdoors or in a well-ventilated area
P280 - Wear protective gloves/ protective clothing
P264 - Wash face, hands and any exposed skin thoroughly after handling
P210 - Keep away from heat/sparks/open flames/hot surfaces. - No smoking
P220 - Keep/Store away from clothing/combustible materials
P221 - Take any precaution to avoid mixing with combustibles

Precautionary Statements - Response
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P337 + P313 - If eye irritation persists: Get medical advice/ attention
P302 + P352 - IF ON SKIN: Wash with plenty of water.
P333 + P313 - If skin irritation or rash occurs: Get medical advice/ attention
P304 + P341 - IF INHALED: If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing
P342 + P311 - If experiencing respiratory symptoms: Call a POISON CENTER or doctor
P301 + P312 - IF SWALLOWED: Call a POISON CENTER or doctor if you feel unwell
P330 - Rinse mouth
P370 + P378 - In case of fire: Use water for extinction

Precautionary Statements - Storage
P403 + P233 - Store in a well-ventilated place. Keep container tightly closed

Hazards not otherwise classified (HNOC)
No hazards not otherwise classified were identified.

Other Information
Risk of decomposition by heat or by contact with incompatible materials

Unknown acute toxicity
0% of the mixture consists of ingredient(s) of unknown toxicity

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula K2O8S2 and $K_2 S_2 O_8$

Chemical name	CAS-No	Weight %
Potassium Persulfate	7727-21-1	> 98
Potassium Sulfate	7778-80-5	< 2

4. FIRST AID MEASURES

General Advice Remove from exposure, lie down. Show this material safety data sheet to the doctor in attendance.

Eye Contact Rinse thoroughly with plenty of water for at least 15 minutes, lifting lower and upper eyelids intermittently. Consult a physician. In case of contact, immediately flush eyes with plenty of water. If symptoms persist, call a physician.

Skin Contact Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Get medical attention if irritation develops and persists.

Inhalation Remove from exposure, lie down. If breathing is irregular or stopped, administer artificial respiration. Call a physician immediately.

Ingestion Do NOT induce vomiting. Call a physician or poison control center immediately. Rinse mouth. Drink 1 or 2 glasses of water.

Most important symptoms and effects, both acute and delayed Itching; Redness; Coughing and/ or wheezing.

Indication of immediate medical attention and special treatment needed, if necessary Treat symptomatically

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media Water. Cool containers with flooding quantities of water until well after fire is out.

Unsuitable extinguishing media Do not use carbon dioxide or other gas filled fire extinguishers; they will have little effect on decomposing persulfate.

Specific Hazards Arising from the Chemical Decomposes under fire conditions to release oxygen that intensifies the fire.

Explosion data
Sensitivity to Mechanical Impact Not sensitive.
Sensitivity to Static Discharge Not sensitive.

Protective equipment and precautions for firefighters As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions Keep off any unprotected persons. Avoid contact with the skin and the eyes. Avoid breathing dust. Wear personal protective equipment.

Other Never add other substances or combustible waste to product residues.

Environmental Precautions Knock down dust with water spray. Avoid penetration into waterways, sewers, soil or

groundwater. Local authorities should be advised if significant spillages cannot be contained.

Methods for Containment Vacuum, shovel or pump waste into a drum and label contents for disposal. Avoid dust formation. Store in closed container.

Methods for cleaning up Clean up spill area and treat as special waste. Dispose of waste as indicated in Section 13.

7. HANDLING AND STORAGE

Handling Wear personal protective equipment. Avoid breathing dust. Handle product only in closed system or provide appropriate exhaust ventilation at machinery. Avoid contact with skin and eyes. Remove and wash contaminated clothing before re-use.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat. Do not store near combustible materials. Avoid contamination of opened product. Keep away from food, drink and animal feedingstuffs. Avoid formation and deposition of dust.

Incompatible products Bases, Halides, Oxidizing agents, Strong reducing agents, Combustible materials.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines .

Chemical name	ACGIH TLV	OSHA PEL	NIOSH	Mexico
Potassium Persulfate 7727-21-1	TWA: 0.1 mg/m³	-	-	-
Chemical name	**British Columbia**	**Quebec**	**Ontario TWAEV**	**Alberta**
Potassium Persulfate 7727-21-1	TWA: 0.1 mg/m³	-	TWA: 0.1 mg/m³	TWA: 0.1 mg/m³

Appropriate engineering controls

Engineering measures Provide local exhaust or general ventilation adequate to maintain exposures below permissable exposure limits.

Individual protection measures, such as personal protective equipment

Eye/Face Protection Eye protection recommended. Chemical goggles consistent with EN 166 or equivalent.

Skin and Body Protection Wear long-sleeved shirt, long pants, socks, and shoes.

Hand Protection Protective gloves: Neoprene gloves, Polyvinylchloride, Natural Rubber.

Respiratory Protection If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn: particulate filtering facepiece respirators.

Hygiene measures Keep away from food, drink and animal feeding stuffs. Do not eat, drink or smoke when using this product. Wash hands before breaks and after shifts. Keep work clothes separate, remove contaminated clothing - launder after open handling of product.

General information Protective engineering solutions should be implemented and in use before personal protective equipment is considered.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance Crystalline solid

Physical State	Solid
Color	White
Odor	odorless
Odor threshold	Not applicable
pH	6.4 (1% solution)
Melting point/freezing point	> 100 °C (Decomposes)
Boiling Point/Range	Decomposes upon heating
Flash point	Not applicable
Evaporation Rate	No information available
Flammability (solid, gas)	Not flammable
Flammability Limit in Air	Not applicable
Upper flammability limit:	No information available
Lower flammability limit:	No information available
Vapor pressure	6.07E-30 mm Hg at 25ºC
Vapor density	No information available
Density	2.48 g/cm³ (crystal density)
Specific gravity	No information available
Water solubility	5.6 % @ 25 °C
Solubility in other solvents	No information available
Partition coefficient	No information available (inorganic)
Autoignition temperature	No evidence of combustion up to 600 °C
Decomposition temperature	> 100 °C (assume)
Viscosity, kinematic	No information available (Solid)
Viscosity, dynamic	No information available
Explosive properties	Not explosive
Oxidizing properties	oxidizer
Molecular weight	270.31
Bulk density	1.30 g/cm³ (loose)

10. STABILITY AND REACTIVITY

Reactivity Strong oxidizer. Oxidizer. Contact with other material may cause fire.

Chemical Stability Decomposition can occur on exposure to heat or moisture.

Possibility of Hazardous Reactions Use of persulfates in chemical reactions requires appropriate precautions and design considerations for pressure and thermal relief.

Decomposing persulfates will evolve large volumes of gas and/or vapor, can accelerate exponentially with heat generation, and create significant and hazardous pressures if contained and not properly controlled or mitigated.

Use with alcohols in the presence of water has been demonstrated to generate conditions that require rigorous adherence to process safety methods and standards to prevent escalation to an uncontrolled reaction.

Hazardous polymerization Hazardous polymerization does not occur.

Conditions to avoid Moisture; Heat. (decomposes at temperatures >100 °C).

Incompatible materials Bases, Halides, Oxidizing agents, Strong reducing agents, Combustible materials.

Hazardous Decomposition Products Incomplete combustion and thermolysis may produce gases of varying toxicity such as carbon monoxide, carbon dioxide, various hydrocarbons, aldehydes and soot.

11. TOXICOLOGICAL INFORMATION

Product Information

Unknown acute toxicity 0% of the mixture consists of ingredient(s) of unknown toxicity

LD50 Oral	1130 mg/kg (rat) (Potassium Persulfate)
LD50 Dermal	> 10000 10,000 mg/kg (rat) (Potassium Persulfate)

LC50 Inhalation > 42.9 mg/L (rat) (Potassium Persulfate)

Serious eye damage/eye irritation Irritating to eyes.
Skin corrosion/irritation Not irritating in animal studies.

Sensitization Sensitizing to skin and respiratory system.

Component Information

Chemical name	LD50 Oral	LD50 Dermal	LC50 Inhalation	NOAEL Oral Value
Potassium Persulfate (7727-21-1)	1130 mg/kg (rat)	>10,000 kg/kg (rat)	> 42.9 mg/L (rat)	
Potassium Sulfate (7778-80-5)	= 6600 mg/kg (Rat)			

Information on toxicological effects

Symptoms No information available.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Carcinogenicity Did not show carcinogenic effects in animal experiments.

Mutagenicity In vivo tests did not show mutagenic effects.

Reproductive toxicity This product is not recognized as reprotox by Research Agencies.

STOT - single exposure May cause respiratory irritation.
STOT - repeated exposure Not classified.
Subchronic toxicity Oral (NOAEL) = 131.5 mg/kg bw (Potassium Persulfate)
Inhalation (NOAEC) = 10.3 mg/m^3 (Ammonium Persulfate)
Dermal: No data available

Target organ effects Eyes, Skin, Respiratory System.

Aspiration hazard No information available.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Ecotoxicity effects Not expected to have significant environmental effects, based on data for similar substances.

Potassium Persulfate (7727-21-1)				
Active Ingredient(s)	Duration	Species	Value	Units
Potassium persulfate	96 h LC50	Onchorhyncus mykiss	76.3	mg/L
Potassium persulfate	48 h EC50	Water flea	120	mg/L
Potassium persulfate	72 h EC50	Marine algae (Phaeodacttylum tricornutum)	136	mg/L
Potassium persulfate	96 h LC50	Turbot (Scophthalmus maximus)	107.6	mg/L
Potassium persulfate	18 h EC10	Pseudonomas putida	36	mg/L
Potassium persulfate	5 d	Abra Alba	11	mg/L
Potassium persulfate	96 h LC50	Grass shrimp	391	mg/L
Potassium persulfate	24 h EC50	Daphnia magna	635.7	mg/L

Persistence and degradability Biodegradability does not pertain to inorganic substances.

Bioaccumulation Does not bioaccumulate.

Mobility Dissociates into ions.

Other Adverse Effects None known.

13. DISPOSAL CONSIDERATIONS

Waste disposal methods This material, as supplied, is a hazardous waste according to federal regulations (40 CFR 261). It must undergo special treatment, e.g. at suitable disposal site, to comply with local regulations.

US EPA Waste Number D001.

Contaminated Packaging Dispose of in accordance with local regulations.

14. TRANSPORT INFORMATION

DOT

UN/ID no 1492
Proper Shipping Name Potassium persulfate
Hazard class 5.1
Packing Group III

TDG

UN/ID no 1492
Proper Shipping Name Potassium persulfate
Hazard class 5.1
Packing Group III

ICAO/IATA

UN/ID no 1492
Proper Shipping Name Potassium persulfate
Hazard class 5.1

Packing Group	III

IMDG/IMO

UN/ID no	1492
Proper Shipping Name	Potassium persulfate
Hazard class	5.1
Packing Group	III

ADR/RID

UN/ID no	1492
Proper Shipping Name	Potassium persulfate
Hazard class	5.1
Packing Group	III

ADN

Proper Shipping Name	Potassium persulfate
Hazard class	5.1
Packing Group	III

15. REGULATORY INFORMATION

U.S. Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

SARA 311/312 Hazard Categories
This product is not subject to reporting under the Emergency Planning and Community Right-to-Know rule.

Clean Water Act
This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

CERCLA/EPCRA
This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material

US State Regulations

U.S. State Right-to-Know Regulations
This product contains the following substances regulated under state Right-to-Know laws:

Chemical name	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Potassium Persulfate	X	X	X		X

California Proposition 65
This product does not contain any Proposition 65 chemicals

CANADA

Environmental Emergencies
This product contains no substances listed under Canada's Environmental Emergency regulations.

Canadian National Pollutant Release Inventory
This product contains no substances reportable under Canada's National Pollutant Release Inventory regulations.

International Inventories

Component	TSCA (United States)	DSL (Canada)	EINECS/ELINCS (Europe)	ENCS (Japan)	China (IECSC)	KECL (Korea)	PICCS (Philippines)	AICS (Australia)	NZIoC (New Zealand)
Potassium Persulfate 7727-21-1 (> 98)	X	X	X	X	X	X	X	X	X
Potassium Sulfate 7778-80-5 (< 2)	X	X	X	X	X	X	X	X	X

Mexico

Mexico - Grade Slight risk, Grade 1

16. OTHER INFORMATION

NFPA	**Health Hazards** 1	**Flammability** 0	**Stability** 1	**Special Hazards** OX
HMIS	**Health Hazards** 1	**Flammability** 0	**Physical hazard** 1	**Special precautions** J

NFPA/HMIS Ratings Legend Severe = 4; Serious = 3; Moderate = 2; Slight = 1; Minimal = 0
Protection=J (Safety goggles, gloves, apron, combination dust and vapor respirator)

Revision date: 2018-07-13
Revision note SDS sections updated: 3

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Prepared By:

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End of Safety Data Sheet

SAFETY DATA SHEET
Klozur® SP

SDS # : 7775-27-1-12
Revision date: 2021-10-14
Format: NA
Version 1.06

1. PRODUCT AND COMPANY IDENTIFICATION

Product Identifier

Product Name Klozur® SP

CAS-No 7775-27-1

Synonyms Sodium Peroxydisulfate; Disodium Peroxydisulfate; Peroxydisulfuric acid, disodium salt; Peroxydisulfuric acid, sodium salt.

Recommended use of the chemical and restrictions on use

Recommended Use: In situ and ex situ chemical oxidation of contaminants and compounds of concern for environmental remediation applications

Restrictions on Use No uses to be advised against were identified.

Manufacturer/Supplier

Evonik Active Oxygens, LLC
2005 Market Street
Suite 3200
Philadelphia, PA 19103
Phone: +1 267/ 422-2400 (General Information)
E-Mail: Product-regulatory-services@evonik.com

Emergency telephone numbers

For leak, fire, spill or accident emergencies, call:
1 800 / 424 9300 (CHEMTREC - U.S.A.)
1 703 / 527 3887 (CHEMTREC - Collect - All Other Countries)
+1 303/ 389-1409 (Medical - U.S. - Call Collect)

2. HAZARDS IDENTIFICATION

Classification

OSHA Regulatory Status
This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute toxicity - Oral	Category 4
Skin corrosion/irritation	Category 2
Serious eye damage/eye irritation	Category 2B
Respiratory sensitization	Category 1
Skin sensitization	Category 1
Specific target organ toxicity (single exposure)	Category 3
Oxidizing Solids	Category 3

GHS Label elements, including precautionary statements

EMERGENCY OVERVIEW

Danger

Hazard Statements
H334 - May cause allergy or asthma symptoms or breathing difficulties if inhaled
H335 - May cause respiratory irritation
H320 - Causes eye irritation
H315 - Causes skin irritation
H317 - May cause an allergic skin reaction
H302 - Harmful if swallowed
H272 - May intensify fire; oxidizer

Precautionary Statements - Prevention
P261 - Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray
P285 - In case of inadequate ventilation wear respiratory protection
P280 - Wear protective gloves/ protective clothing/ eye protection/ face protection
P264 - Wash face, hands and any exposed skin thoroughly after handling
P272 - Contaminated work clothing should not be allowed out of the workplace
P270 - Do not eat, drink or smoke when using this product
P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking
P220 - Keep away from clothing and other combustible materials

Precautionary Statements - Response
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P337 + P313 - If eye irritation persists: Get medical advice/ attention
P302 + P352 - IF ON SKIN: Wash with plenty of water.
P333 + P313 - If skin irritation or rash occurs: Get medical advice/ attention
P362 + P364 - Take off all contaminated clothing and wash it before reuse
P304 + P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing
P342 + P311 - If experiencing respiratory symptoms: Call a POISON CENTER or doctor
P301 + P312 - IF SWALLOWED: Call a POISON CENTER or doctor if you feel unwell
P330 - Rinse mouth

P370 + P378 - In case of fire: Use water for extinction

Precautionary Statements - Storage
P403 + P233 - Store in a well-ventilated place. Keep container tightly closed
P405 - Store locked up

Precautionary Statements - Disposal
P501 - Dispose of contents/ container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)
No hazards not otherwise classified were identified.

Other Information
Risk of decomposition by heat or by contact with incompatible materials

Unknown acute toxicity
0% of the mixture consists of ingredient(s) of unknown toxicity

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula Na2O8S2

Chemical name	CAS-No	Weight %
Sodium Persulfate	7775-27-1	> 99
Sodium sulfate	7757-82-6	< 1

4. FIRST AID MEASURES

General Advice Remove from exposure, lie down. Show this material safety data sheet to the doctor in attendance.

Eye Contact Rinse thoroughly with plenty of water for at least 15 minutes, lifting lower and upper eyelids intermittently. Consult a physician. In case of contact, immediately flush eyes with plenty of water. If symptoms persist, call a physician.

Skin Contact Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Get medical attention if irritation develops and persists.

Inhalation Remove from exposure, lie down. If breathing is irregular or stopped, administer artificial respiration. Call a physician immediately.

Ingestion Do NOT induce vomiting. Call a physician or poison control center immediately. Rinse mouth. Drink 1 or 2 glasses of water.

Most important symptoms and effects, both acute and delayed Itching; Redness; Coughing and/ or wheezing.

Indication of immediate medical attention and special treatment needed, if necessary Treat symptomatically

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media Water. Cool containers with flooding quantities of water until well after fire is out.

Unsuitable extinguishing media Do not use carbon dioxide or other gas filled fire extinguishers; they will have little effect on decomposing persulfate.

Specific Hazards Arising from the Chemical Decomposes under fire conditions to release oxygen that intensifies the fire.

Explosion data
Sensitivity to Mechanical Impact Not sensitive.
Sensitivity to Static Discharge Not sensitive.

Protective equipment and precautions for firefighters As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions Keep off any unprotected persons. Avoid contact with the skin and the eyes. Avoid breathing dust. Wear personal protective equipment.

Other Never add other substances or combustible waste to product residues.

Environmental Precautions Knock down dust with water spray. Avoid penetration into waterways, sewers, soil or groundwater. Local authorities should be advised if significant spillages cannot be contained.

Methods for Containment Vacuum, shovel or pump waste into a drum and label contents for disposal. Avoid dust formation. Store in closed container.

Methods for cleaning up Clean up spill area and treat as special waste. Dispose of waste as indicated in Section 13.

7. HANDLING AND STORAGE

Handling Wear personal protective equipment. Avoid breathing dust. Handle product only in closed system or provide appropriate exhaust ventilation at machinery. Avoid contact with skin and eyes. Remove and wash contaminated clothing before re-use.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat. Do not store near combustible materials. Avoid contamination of opened product. Keep away from food, drink and animal feedingstuffs. Avoid formation and deposition of dust.

Incompatible products Bases, Halides, Oxidizing agents, Strong reducing agents, Combustible materials.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines .

Chemical name	ACGIH TLV	OSHA PEL	NIOSH	Mexico
Sodium Persulfate 7775-27-1	TWA: 0.1 mg/m³	-	-	-
Chemical name	**British Columbia**	**Quebec**	**Ontario TWAEV**	**Alberta**
Sodium Persulfate 7775-27-1	TWA: 0.1 mg/m³	-	TWA: 0.1 mg/m³	TWA: 0.1 mg/m³

Appropriate engineering controls

Engineering measures Ensure adequate ventilation, especially in confined areas.

Individual protection measures, such as personal protective equipment

Eye/Face Protection Eye protection recommended. Chemical goggles consistent with EN 166 or equivalent.

Skin and Body Protection Wear long-sleeved shirt, long pants, socks, and shoes.

Hand Protection Protective gloves: Neoprene gloves, Polyvinylchloride, Natural Rubber.

Respiratory Protection If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn: particulate filtering facepiece respirators.

Hygiene measures Keep away from food, drink and animal feeding stuffs. Do not eat, drink or smoke when using this product. Wash hands before breaks and after shifts. Keep work clothes separate, remove contaminated clothing - launder after open handling of product.

General information Protective engineering solutions should be implemented and in use before personal protective equipment is considered.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	Crystalline solid
Physical State	Solid
Color	White
Odor	odorless
Odor threshold	Not applicable
pH	6.0 (1% solution)
Melting point/freezing point	180 °C (Decomposes)
Boiling Point/Range	Decomposes on heating
Flash point	Not flammable
Evaporation Rate	Not applicable
Flammability (solid, gas)	Not flammable
Flammability Limit in Air	Not applicable
Upper flammability limit:	No information available
Lower flammability limit:	No information available
Vapor pressure	6.07E-30 mm Hg at 25ºC
Vapor density	No information available
Density	2.59 g/cm³ (crystal density)
Specific gravity	No information available
Water solubility	42 % @ 25 °C
Solubility in other solvents	No information available
Partition coefficient	No information available
Autoignition temperature	No evidence of combustion up to 600°C
Decomposition temperature	> 100 °C (assume)
Viscosity, kinematic	No information available (Solid)
Viscosity, dynamic	No information available
Explosive properties	Not explosive
Oxidizing properties	oxidizer

Other Information

Molecular weight	238.1
VOC content (%)	Not applicable
Bulk density	1.12 g/cm³ (loose)

10. STABILITY AND REACTIVITY

Reactivity Strong oxidizer. Oxidizer. Contact with other material may cause fire.

Chemical Stability Decomposition can occur on exposure to heat or moisture.

Possibility of Hazardous Reactions Use of persulfates in chemical reactions requires appropriate precautions and design considerations for pressure and thermal relief.

Decomposing persulfates will evolve large volumes of gas and/or vapor, can accelerate exponentially with heat generation, and create significant and hazardous pressures if contained and not properly controlled or mitigated.

Use with alcohols in the presence of water has been demonstrated to generate conditions that require rigorous adherence to process safety methods and standards to prevent escalation to an uncontrolled reaction.

Hazardous polymerization Hazardous polymerization does not occur.

Conditions to avoid Heat. (decomposes at 275 °C); Moisture.

Incompatible materials Bases, Halides, Oxidizing agents, Strong reducing agents, Combustible materials.

Hazardous Decomposition Products Oxygen which supports combustion; Sulfur oxides.

11. TOXICOLOGICAL INFORMATION

Product Information

Unknown acute toxicity 0% of the mixture consists of ingredient(s) of unknown toxicity

LD50 Oral 895 mg/kg (rat) (Sodium Persulfate)
LD50 Dermal > 10,000 mg/kg (rabbit) (Sodium Persulfate)
LC50 Inhalation > 5.1 mg/L (rat) (4-hr) (Sodium Persulfate)

Serious eye damage/eye irritation Irritating to eyes.
Skin corrosion/irritation Minimally irritating.

Sensitization Sensitizing to skin and respiratory system.

Component Information

Chemical name	LD50 Oral	LD50 Dermal	LC50 Inhalation	NOAEL Oral Value
Sodium sulfate (7757-82-6)	> 10000 mg/kg (Rat)			

Information on toxicological effects

Symptoms Symptoms of allergic reaction may include rash, itching, swelling and trouble breathing.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Irritating to eyes, respiratory system and skin.
corrosivity None.

Carcinogenicity Did not show carcinogenic effects in animal experiments.

Mutagenicity In vivo tests did not show mutagenic effects.

Reproductive toxicity This product is not recognized as reprotox by Research Agencies.

STOT - single exposure May cause respiratory irritation.
STOT - repeated exposure Not classified.
Subchronic toxicity Oral (NOAEL) = 131.5 mg/kg bw (Sodium Persulfate)
Inhalation (NOAEC) = 10.3 mg/m³ (Ammonium Persulfate) Dermal: No data available

Target organ effects Eyes, Skin, Respiratory System.

Aspiration hazard Not applicable.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Ecotoxicity effects

Sodium Persulfate (7775-27-1)				
Active Ingredient(s)	Duration	Species	Value	Units
Sodium Persulfate	96 h LC50	Rainbow trout	163	mg/L
Sodium Persulfate	48 h LC50	Daphnia magna	133	mg/L
Sodium Persulfate	96 h LC50	Grass shrimp	519	mg/L
Sodium Persulfate	72 h EC50	Algae Selenastrum capricornutum	116	mg/L

Persistence and degradability Biodegradability does not pertain to inorganic substances.

Bioaccumulation Does not bioaccumulate.

Mobility Dissociates into ions.

Other Adverse Effects None known.

13. DISPOSAL CONSIDERATIONS

Waste disposal methods This material, as supplied, is a hazardous waste according to federal regulations (40 CFR 261). It must undergo special treatment, e.g. at suitable disposal site, to comply with local regulations.

US EPA Waste Number D001.

Contaminated Packaging Dispose of in accordance with local regulations.

14. TRANSPORT INFORMATION

DOT

UN/ID no UN 1505
Proper Shipping Name SODIUM PERSULFATE
Hazard class 5.1
Packing Group III

TDG

UN/ID no	UN 1505
Proper Shipping Name	SODIUM PERSULFATE
Hazard class	5.1
Packing Group	III

MEX

UN/ID no	UN 1505
Proper Shipping Name	SODIUM PERSULFATE
Hazard class	5.1
Packing Group	III

ICAO/IATA

UN/ID no	1505
Proper Shipping Name	SODIUM PERSULFATE
Hazard class	5.1
Packing Group	III

IMDG/IMO

UN/ID no	1505
Proper Shipping Name	SODIUM PERSULFATE
Hazard class	5.1
Packing Group	III

ADR/RID

UN/ID no	UN 1505
Proper Shipping Name	SODIUM PERSULFATE
Hazard class	5.1
Packing Group	III

ADN

Proper Shipping Name	SODIUM PERSULFATE
Hazard class	5.1
Packing Group	III

15. REGULATORY INFORMATION

U.S. Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

SARA 311/312 Hazard Categories

This product has the following hazards that are reportable under The Emergency Planning and Community Right-to-Know rule (EPCRA Tier II):

- Oxidizer
- Acute toxicity
- Skin corrosion/irritation
- Serious eye damage/eye irritation
- Respiratory/skin sensitization
- Specific Target Organ Toxicity (STOT) - Single Exposure

Clean Water Act

This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

CERCLA/EPCRA

This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level

pertaining to releases of this material

US State Regulations

U.S. State Right-to-Know Regulations
This product contains the following substances regulated under state Right-to-Know laws:

Chemical name	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Sodium sulfate	X		X		
Sodium Persulfate		X			

California Proposition 65
This product does not contain any Proposition 65 chemicals

CANADA

Environmental Emergencies
This product contains no substances listed under Canada's Environmental Emergency regulations.

Canadian National Pollutant Release Inventory
This product contains no substances reportable under Canada's National Pollutant Release Inventory regulations.

International Inventories

Chemical name	TSCA (United States)	DSL (Canada)	EINECS/ELINCS (Europe)	ENCS (Japan)	China (IECSC)	KECL (Korea)	PICCS (Philippines)	AICS (Australia)	NZIoC (New Zealand)
Sodium sulfate 7757-82-6	X	X	231-820-9	X	X	X	X	X	X
Sodium Persulfate 7775-27-1	X	X	231-892-1	X	X	X	X	X	X

All ingredients are directly listed on the active TSCA Inventory

Mexico

Mexico - Grade Slight risk, Grade 1

16. OTHER INFORMATION

NFPA	**Health Hazards** 1	**Flammability** 0	**Stability** 1	**Special Hazards** OX
HMIS	**Health Hazards** 1	**Flammability** 0	**Physical hazard** 1	**Special precautions** J

NFPA/HMIS Ratings Legend Severe = 4; Serious = 3; Moderate = 2; Slight = 1; Minimal = 0
OX = Oxidizer
Protection=J (Safety goggles, gloves, apron, combination dust and vapor respirator)

Revision date: 2021-10-14
Revision note Manufacturer name changed.

Issuing Date: 2021-10-14

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Prepared By:

Evonik

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End of Safety Data Sheet

ATTACHMENT D

Quality Assurance Project Plan

QUALITY ASSURANCE PROJECT PLAN

FOR

WILLETS POINT DEVELOPMENT L-PARCEL

126th STREET/WILLETS POINT BOULEVARD
QUEENS, NEW YORK
NYSDEC BCP Site No. C241146H

Prepared for

Queens Development Group, LLC
QDG Hotel Partners, LLC
QDG 126th Street Partners, LLC
QDG Parking Partners, LLC
QDG Retail Partners, LLC
Willets Point Phase I Owner, LLC
Willets Point Phase I LIHTC Owner, L.P.
c/o The Related Companies
30 Hudson Yards
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Prepared by:

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October 2023

Langan Project No: 170197605

LANGAN

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Attachment C: Laboratory Reporting Limits and Method Detection Limits
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1.0 PROJECT DESCRIPTION

1.1 Introduction

This Quality Assurance Project Plan (QAPP) was prepared on behalf of The Queens Development Group, LLC (QDG); QDG Hotel Partners, LLC; QDG 126th Street Partners, LLC; QDG Parking Partners, LLC; and QDG Retail Partners, LLC (collectively, the Volunteer) for the property known as the overall Willets Point Development Brownfield Cleanup Program (BCP) Site. The Volunteer entered into the New York State Department of Environmental Conservation (NYSDEC) BCP (BCP Site No. C241146) under the December 16, 2013 Brownfield Cleanup Agreement (BCA) (Index No. C241146-X-X). The BCA was amended on July 14, 2014 to increase the BCP Site size by 5.6 acres and includes the addition of 14 tax lots and 3 partial roadways, and the removal of 3 tax lots and 2 partial roadways. A second BCA amendment was issued on September 23, 2014 to add language related to an Independent Environmental Monitor that was omitted from the original BCA. A third BCA amendment was executed on June 10, 2020 to account for the 2015 changes to the BCP legislation. A fourth amendment to the BCA, dated August 28, 2023, divided the 22.868-acre Willets Point Development BCP Site into eight separate sites (BCP Site Nos. C241146 and C241146B through C241146H).

This QAPP was prepared for the Site which is 1.120 acres and is comprised of Queens Borough Tax Block 1820, Lot 9. This QAPP specifies the sampling procedures to be followed and the analytical methods to be used to ensure that data from the proposed investigation are precise, accurate, representative, comparable, and complete.

1.2 Project Objectives

Future site renovations and improvements or new construction requiring the disturbance, excavation, and/or off-site removal of soil, vapor, or groundwater may warrant the collection and analysis of soil, vapor, and groundwater samples in accordance with the Excavation Work Plan (EWP) included in Appendix D of the SMP, and NYSDEC Divisions of Environmental Remediation (DER)-10: Technical Guidance for Site Investigation and Remediation. Accordingly, this QAPP addresses sampling and analytical methods that may be necessary in support of future improvements or proposed modifications to the SMP. These objectives have been established to meet standards that will protect public health and the environment for the Site.

1.3 Scope of Work

The specific scope of work covered in this QAPP includes any future intrusive work at the Site that may be conducted and any site activities covered under the SMP. The SMP governs future activities relative to the Site which may include soil, groundwater, or vapor sampling.

2.0 DATA QUALITY OBJECTIVES AND PROCESSES

Data Quality Objectives (DQOs) are qualitative and quantitative statements to help ensure that data of known and appropriate quality are obtained during the project. The sampling program will provide for collection of soil, soil vapor, indoor air, or groundwater samples as part of a future need for sampling. DQOs for sampling activities are determined by evaluating five factors:

- Data needs and uses: The types of data required and how the data will be used after it is obtained.
- Parameters of Interest: The types of chemical or physical parameters required for the intended use.
- Level of Concern: Levels of constituents, which may require remedial actions or further investigations.
- Required Analytical Level: The level of data quality, data precision, and QA/QC documentation required for chemical analysis.
- Required Detection Limits: The detection limits necessary based on the above information.

The quality assurance and quality control objectives for all measurement data include:

- **Precision** – an expression of the reproducibility of measurements of the same parameter under a given set of conditions. Field sampling precision will be determined by analyzing coded duplicate samples and analytical precision will be determined by analyzing internal QC duplicates and/or matrix spike duplicates.
- **Accuracy** – a measure of the degree of agreement of a measured value with the true or expected value of the quantity of concern. For soil and groundwater samples, accuracy will be determined through the assessment of the analytical results of field blanks and trip blanks for each sample set. Analytical accuracy will be assessed by examining the percent recoveries of surrogate compounds that are added to each sample (organic analyses only), internal standards, laboratory method blanks, instrument calibration, and the percent recoveries of matrix spike compounds added to selected samples and laboratory blanks.

  For soil vapor or air samples, analytical accuracy will be assessed by examining the percent recoveries that are added to each sample, internal standards, laboratory method blanks, and instrument calibration.
- **Representativeness** – expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is dependent upon the adequate design of the sampling program and will be satisfied by ensuring that the scope of work is followed and that specified sampling and analysis techniques are used. Representativeness in the laboratory is ensured by compliance to nationally-recognized

analytical methods, meeting sample holding times, and maintaining sample integrity while the samples are in the laboratory's possession. This is accomplished by following all applicable methods, laboratory-issued standard operating procedures (SOPs), the laboratory's Quality Assurance Manual, and this QAPP. The laboratory is required to be properly certified and accredited.

- **Completeness** – the percentage of measurements made which are judged to be valid. Completeness will be assessed through data validation. The QC objective for completeness is generation of valid data for at least 90 percent of the analyses requested.
- **Comparability** – expresses the degree of confidence with which one data set can be compared to another. The comparability of all data collected for this project will be ensured using several procedures, including standard methods for sampling and analysis as documented in the QAPP, using standard reporting units and reporting formats, and data validation.
- **Sensitivity** – the ability of the instrument or method to detect target analytes at the levels of interest. The project manager will select, with input from the laboratory and QA personnel, sampling and analytical procedures that achieve the required levels of detection.

3.0 PROJECT ORGANIZATION

Any future remedial activities and investigations will be overseen by Langan or another environmental consultant for the Volunteers or a future owner. The environmental consultant will also arrange data analysis for reporting tasks. The analytical services will be performed by an ELAP-certified laboratory. Data validation services will be performed by approved data validation contractor(s). Sampling will be conducted by Langan and the analytical services will be performed by Alpha Analytical Laboratories, Inc. of Westborough, Massachusetts (NYSDOH ELAP certification number 11148) and/or York Analytical Laboratories, Inc. of Stratford, Connecticut (NYSDOH ELAP certification number 10854). Data validation services will be performed by Joseph Conboy; resume attached (Attachment B).

Soil sampling is not anticipated during implementation of the SMP. Soil samples may be collected during future invasive/excavation activities to assess potential impacts from contaminant source, waste characterization sampling, and health and safety monitoring.

Key contacts for this project are summarized below; Langan resumes are included in Attachment B:

Langan Technical Manager:	Mr. Jason Hayes Telephone: (212) 479-5427
Langan Project Manager:	Mr. Gerald Nicholls Telephone: (212) 479-5554
Langan Quality Assurance Officer (QAO):	Mr. William Bohrer Telephone: (212) 479-5533
Data Validator and Program Quality Assurance Monitor:	Mr. Joseph Conboy Telephone: (215) 845-8985
Laboratory Representative:	Ben Rao Alpha Analytical Telephone: (201) 812-2633 Ms. Lidya Gulizia York Analytical Telephone: (203) 325-1371 X833

4.0 QUALITY ASSURANCE/QUALITY CONTROL OBJECTIVES FOR MEASUREMENT OF DATA

The overall quality assurance objective is to develop and implement procedures for sampling, laboratory analysis, field measurements, and reporting that will provide data of sufficient quality for the remedial investigation at the Site. The sample set, chemical analysis results, and interpretations must be based on data that meet or exceed quality assurance objectives established for the Site. Quality assurance objectives are usually expressed in terms of accuracy or bias, sensitivity, completeness, representativeness, comparability, and sensitivity of analysis. Variances from the quality assurance objectives at any stage of the investigation will result in the implementation of appropriate corrective measures and an assessment of the impact of corrective measures on the usability of the data.

4.1 Precision

Precision is a measure of the degree to which two or more measurements are in agreement. Field precision is assessed through the collection and measurement of field duplicates. Laboratory precision and sample heterogeneity also contribute to the uncertainty of field duplicate measurements. This uncertainty is taken into account during the data assessment process. For field duplicates, results less than 2x the reporting limit (RL) meet the precision criteria if the absolute difference is less than ±2x the RL and acceptable based on professional judgement. For results greater than 2x the RL, the acceptance criteria is a relative percent difference (RPD) of ≤50% (soil and air), <30% (water). RLs and method detection limits (MDL) are provided in Attachment C.

4.2 Accuracy

Accuracy is the measurement of the reproducibility of the sampling and analytical methodology. It should be noted that precise data may not be accurate data. For the purpose of this QAPP, bias is defined as the constant or systematic distortion of a measurement process, which manifests itself as a persistent positive or negative deviation from the known or true value. This may be due to (but not limited to) improper sample collection, sample matrix, poorly calibrated analytical or sampling equipment, or limitations or errors in analytical methods and techniques.

Accuracy in the field is assessed through the use of field blanks and through compliance to all sample handling, preservation, and holding time requirements. All field blanks should be non-detect when analyzed by the laboratory. Any contaminant detected in an associated field blank will be evaluated against laboratory blanks (preparation or method) and evaluated against field samples collected on the same day to determine potential for bias. Trip blanks are not required for non-aqueous matrices but are planned for non-aqueous matrices where high concentrations of VOCs are anticipated.

Laboratory accuracy is assessed by evaluating the percent recoveries of matrix spike/matrix spike duplicate (MS/MSD) samples, laboratory control samples (LCS), surrogate compound recoveries, and the results of method preparation blanks. MS/MSD, LCS, and surrogate percent recoveries will be compared to either method-specific control limits or laboratory-derived control limits. Sample volume permitting, samples displaying outliers should be reanalyzed. All associated method blanks should be non-detect when analyzed by the laboratory.

4.3 Representativeness

Representativeness expresses the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition within a defined spatial and/or temporal boundary. Representativeness is dependent upon the adequate design of the sampling program and will be satisfied by ensuring that the scope of work is followed and that specified sampling and analysis techniques are used. This is performed by following applicable standard operating procedures (SOPs) and this QAPP. All field technicians will be given copies of appropriate documents prior to sampling events and are required to read, understand, and follow each document as it pertains to the tasks at hand.

Representativeness in the laboratory is ensured by compliance to nationally-recognized analytical methods, meeting sample holding times, and maintaining sample integrity while the samples are in the laboratory's possession. This is performed by following all applicable EPA methods, laboratory-issued SOPs, the laboratory's Quality Assurance Manual, and this QAPP. The laboratory is required to be properly certified and accredited.

4.4 Completeness

Laboratory completeness is the ratio of total number of samples analyzed and verified as acceptable compared to the number of samples submitted to the fixed-base laboratory for analysis, expressed as a percent. Three measures of completeness are defined:

- Sampling completeness, defined as the number of valid samples collected relative to the number of samples planned for collection;
- Analytical completeness, defined as the number of valid sample measurements relative to the number of valid samples collected; and
- Overall completeness, defined as the number of valid sample measurements relative to the number of samples planned for collection.

Air, soil vapor, soil, and groundwater data will meet a 90% completeness criterion. If the criterion is not met, sample results will be evaluated for trends in rejected and unusable data. The effect of unusable data required for a determination of compliance will also be evaluated.

4.5 Comparability

Comparability is an expression of the confidence with which one data set can be compared to another. Comparability is dependent upon the proper design of the sampling program and will be satisfied by ensuring that the sampling plan is followed and that sampling is performed according to the SOPs or other project-specific procedures. Analytical data will be comparable when similar sampling and analytical methods are used as documented in the QAPP. Comparability will be controlled by requiring the use of specific nationally-recognized analytical methods and requiring consistent method performance criteria. Comparability is also dependent on similar quality assurance objectives. Previously collected data will be evaluated to determine whether they may be combined with contemporary data sets.

4.6 Sensitivity

Sensitivity is the ability of the instrument or method to detect target analytes at the levels of interest. The project director will select, with input from the laboratory and QA personnel, sampling and analytical procedures that achieve the required levels of detection and QC acceptance limits that meet established performance criteria. Concurrently, the project director will select the level of data assessment to ensure that only data meeting the project DQOs are used in decision-making.

Field equipment will be used that can achieve the required levels of detection for analytical measurements in the field. In addition, the field sampling staff will collect and submit full volumes of samples as required by the laboratory for analysis, whenever possible. Full volume aliquots will help ensure achievement of the required limits of detection and allow for reanalysis if necessary. The concentration of the lowest level check standard in a multi-point calibration curve will represent the reporting limit.

Analytical methods and quality assurance parameters associated with the sampling program are presented in Attachment D. The frequency of associated field blanks and duplicate samples will be based on the recommendations listed in DER-10, and as described in Section 5.3.

Site-specific MS and MSD samples will be prepared and analyzed by the analytical laboratory by spiking an aliquot of submitted sample volume with analytes of interest. Additional sample volume is not required by the laboratory for this purpose. An MS/MSD analysis will be analyzed at a rate of 1 out of every 20 samples, or one per analytical batch. MS/MSD samples are only required for soil and groundwater samples.

5.0 SAMPLE COLLECTION AND FIELD DATA ACQUISITION PROCEDURES

Soil and groundwater sampling will be conducted in accordance with the established NYSDEC protocols contained in DER-10/Technical Guidance for Site Investigation and Remediation (May 2010) and the NYSDEC's "Guidance for Sampling and Analysis of PFAS Under NYSDEC's Part 375 Remedial Programs" (April 2023). Air sampling will be conducted in accordance with the established NYSDOH protocols contained in the Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006, updated May 2017). The following sections describe procedures to be followed for specific tasks.

5.1 Field Documentation Procedures

Field documentation procedures will include summarizing field observations in field books, and proper sample labeling. These procedures are described in the following sections.

5.1.1 Field Data and Notes

Field notebooks contain the documentary evidence regarding procedures conducted by field personnel. Hard cover, bound field notebooks will be used because of their compact size, durability, and secure page binding. The pages of the notebook will not be removed.

Entries will be made in waterproof, permanent blue or black ink. No erasures will be allowed. If an incorrect entry is made, the information will be crossed out with a single strike mark and the change initialed and dated by the team member making the change. Each entry will be dated. Entries will be legible and contain accurate and complete documentation of the individual or sampling team's activities or observations made. The level of detail will be sufficient to explain and reconstruct the activity conducted. Each entry will be signed by the person(s) making the entry.

The following types of information will be provided for each sampling task, as appropriate:

- Project name and number
- Reasons for being on-site or taking the sample
- Date and time of activity
- Sample identification numbers
- Geographical location of sampling points with references to the site, other facilities or a map coordinate system. Sketches will be made in the field logbook when appropriate
- Physical location of sampling locations such as depth below ground surface
- Description of the method of sampling including procedures followed, equipment used and any departure from the specified procedures
- Description of the sample including physical characteristics, odor, etc.
- Readings obtained from health and safety equipment

- Weather conditions at the time of sampling and previous meteorological events that may affect the representative nature of a sample
- Photographic information including a brief description of what was photographed, the date and time, the compass direction of the picture and the number of the picture on the camera
- Other pertinent observations such as the presence of other persons on the Site, actions by others that may affect performance of site tasks, etc.
- Names of sampling personnel and signature of persons making entries

Field records will also be collected on field data sheets including boring logs, which will be used for geologic and drilling data during soil boring activities. Field data sheets will include the project-specific number and stored in the field project files when not in use. At the completion of the field activities, the field data sheets will be maintained in the central project file.

5.1.2 Sample Labeling

Each sample collected will be assigned a unique identification number in accordance with the sample nomenclature guidance included in Attachment E and placed in an appropriate sample container. Each sample container will have a sample label affixed to the outside with the date and time of sample collection and project name. In addition, the label will contain the sample identification number, analysis required, and chemical preservatives added, if any. All documentation will be completed in waterproof ink.

5.2 Equipment Calibration and Preventative Maintenance

A photoionization detector (PID) will be used during the sampling activities to evaluate work zone action levels and screen soil during excavation/disposal and before collecting performance documentation samples. Field calibration and/or field checking of the PID will be the responsibility of the field team leader and the site HSO, and will be accomplished by following the procedures outlined in the operating manual for the instrument. An air monitor capable of measuring particulate matter up to 10 micrometers (µm) in diameter will be used to evaluate perimeter air quality resulting from the work. At a minimum, field calibration and/or field equipment checking will be performed once daily, prior to use. Field calibration will be documented in the field notebook. Entries made into the logbook regarding the status of field equipment will include the following information:

- Date and time of calibration
- Type of equipment serviced and identification number (such as serial number)
- Reference standard used for calibration
- Calibration and/or maintenance procedure used
- Other pertinent information

Equipment that fails calibration or becomes inoperable during use will be removed from service and segregated to prevent inadvertent utilization. The equipment will be properly tagged to indicate that it is out of calibration. Such equipment will be repaired and recalibrated to the manufacturer's specifications by qualified personnel. Equipment that cannot be repaired will be replaced.

Off-site calibration and maintenance of field instruments will be conducted as appropriate throughout the duration of project activities. All field instrumentation, sampling equipment and accessories will be maintained in accordance with the manufacturer's recommendations and specifications and established field equipment practice. Off-site calibration and maintenance will be performed by qualified personnel. A logbook will be kept to document that established calibration and maintenance procedures have been followed. Documentation will include both scheduled and unscheduled maintenance.

5.3 Sample Collection

5.3.1 Soil Samples

Soil samples will be visually classified and field screened using a PID to assess potential impacts from VOCs and for health and safety monitoring. Soil samples collected for analysis of VOCs will be collected using either EnCore® or Terra Core® sampling equipment. For analysis of non-volatile parameters, samples will be homogenized and placed into glass jars. After collection, all sample jars will be capped and securely tightened, and placed in iced coolers and maintained at 4°C ±2°C until they are transferred to the laboratory for analysis, in accordance with the procedures outlined in Section 5.4. Analysis and/or extraction and digestion of collected soil samples will meet the holding times required for each analyte as specified in Attachment D. In addition, analysis of collected soil sample will meet all quality assurance criteria set forth by this QAPP and DER-10.

5.3.2 Groundwater Samples

Groundwater sampling will be conducted using low-flow sampling procedures following USEPA guidance ("Low Stress [low flow] Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells", EQASOP-GW4, September 19, 2017). Groundwater samples collected for PFAS will be collected in accordance with the protocols established in NYSDEC's "Guidance for Sampling, Analysis, and Assessment of PFAS Under NYSDEC's Part 375 Remedial Programs" (April 2023), which is provided in Attachment F.

During purging, field parameters should be measured, including: water level drawdown, purge rate, pH, specific conductance, temperature, dissolved oxygen, turbidity and ORP, every five minutes using a water quality meter (Horiba U-52 or similar) and a depth-to-water oil-water interface probe that should be decontaminated between wells. For wells being sampled with PFAS, monitoring wells will be gauged for depth to water following sample collection. Samples should generally not be collected until the field parameters have stabilized. Field parameters will be considered stable once three sets of measurements are within ±0.1 standard units for pH, ±3% for conductivity and temperature, ±10 millivolts for ORP, and ±10% for turbidity and dissolved oxygen. Purge rates should be adjusted to keep the drawdown in the well to less than

0.3 feet, as practical. Additionally, an attempt should be made to achieve a stable turbidity reading of less than 10 Nephelometric Turbidity Units (NTU) prior to sampling. If the turbidity reading does not stabilize at reading of less than 10 NTU for a given well, then both filtered and unfiltered samples should be collected from that well. If necessary, field filtration should be performed using a 0.45-micron disposable in-line filter. Groundwater samples should be collected after parameters have stabilized as noted above or the readings are within the precision of the meter. Deviations from the stabilization and drawdown criteria, if any, should be noted on the sampling logs.

Samples should be collected directly into pre-cleaned laboratory-supplied jars. Samples collected for PFAS analysis will be collected into HDPE containers. After collection, sample jars will be capped and securely tightened, and placed in iced coolers to attempt to maintain a temperature of 4°C ±2°C until they are transferred to the laboratory for analysis, in accordance with the procedures outlined in Section 5.4. Analysis and/or extraction and digestion of collected groundwater samples will meet the holding times required for each analyte as specified in Attachment C. In addition, analysis of collected groundwater samples will meet all quality assurance criteria set forth by this QAPP and DER-10.

5.3.3 Air Samples

In the event that soil vapor sampling is required, prior to sample collection, a pre-sampling inspection will be conducted to document chemicals and potential subsurface pathways at the site. Air samples will be collected into laboratory-supplied, batch certified-clean Summa® canisters calibrated for a duration of two to eight hours. The pressure gauges on each calibrated flow controller should be monitored throughout sample collection. Sample collection should be stopped when the pressure reading reaches -4 mmHg.

If a sub-slab depressurization system is necessary in future buildings developed at the site, sub-slab samples will be collected from vapor monitoring points or from riser pipe sample ports. The samples will be collected into laboratory-supplied, batch certified-clean Summa® canisters calibrated for a duration of two to eight hours. The pressure gauges on each calibrated flow controller should be monitored throughout sample collection. Sample collection should be stopped when the pressure reading reaches -4 mmHg.

5.3.4 Sample Field Blanks and Duplicates

Field blanks will be collected for quality assurance purposes at a rate of one per 20 investigative samples per matrix (soil and groundwater only). For PFAS and 1,4-dioxane, field blanks will be collected at a frequency of one per day per matrix. Field blanks will be obtained by pouring laboratory-demonstrated analyte-free water on or through a decontaminated sampling device following use and implementation of decontamination protocols. The water will be collected off of the sampling device into a laboratory-provided sample container for analysis. Field blank samples will be analyzed for the complete list of analytes on the day of sampling. Trip blanks will be collected for each sample shipment that includes VOC analysis.

Duplicate soil samples will be collected and analyzed for quality assurance purposes. Duplicate samples will be collected at a frequency of 1 per 20 samples and will be submitted to the laboratory as "blind" samples. If less than 20 samples are collected during a particular sampling event, one duplicate sample will be collected.

5.4 Sample Containers and Handling

Certified, commercially clean sample containers will be obtained from the analytical laboratory. For soil and groundwater samples, the laboratory will also prepare and supply the required trip blanks and field blank sample containers and reagent preservatives. Sample bottle containers, including the field blank containers, will be placed into plastic coolers by the laboratory. These coolers will be received by the field sampling team within 24 hours of their preparation in the laboratory. Prior to the commencement of field work, Langan field personnel will fill the plastic coolers with ice in Ziploc® bags (or equivalent) to maintain a temperature of 4° ±2° C.

Soil samples collected in the field for laboratory analysis will be placed directly into the laboratory-supplied sample containers. Samples will then be placed and stored on-ice in laboratory provided coolers until shipment to the laboratory. The temperature in the coolers containing samples and associated field blanks will be maintained at a temperature of 4°±2°C while on-site and during sample shipment to the analytical laboratory. Blue ice will not be used to cool PFAS samples.

Possession of samples collected in the field will be traceable from the time of collection until they are analyzed by the analytical laboratory or are properly disposed. Chain-of-custody procedures, described in Section 5.9, will be followed to maintain and document sample possession. Samples will be packaged and shipped as described in Section 5.6.

5.5 Special Considerations for Emerging Contaminant Sample Collection

The following special considerations apply to the collection of soil and groundwater samples for PFAS analysis to prevent cross-contamination:

- Field equipment will not contain Teflon®
- All sampling material will be made from stainless steel, HDPE, acetate, silicon, or polypropylene
- No waterproof field books will be used
- No plastic clipboards, binders, or spiral hard cover notebooks will be used
- No adhesives will be used
- No sharpies or permanent markers will be used; ball point pens are acceptable
- Aluminum foil will not be used
- PFAS samples will be kept in a separate cooler from other sampling containers
- Coolers will be filled only with regular ice

PFAS will be analyzed by modified USEPA Method 1633 for the PFAS target analyte list developed by the DER. At minimum, the laboratory will report the following PFAS target compounds:

Group	Chemical Name	Abbreviation	CAS Number
Perfluoroalkyl sulfonic acids	Perfluorobutanesulfonic acid	PFBS	375-73-5
	Perfluoropentanesulfonic acid	PFPeS	2706-91-4
	Perfluorohexanesulfonic acid	PFHxS	355-46-4
	Perfluoroheptanesulfonic acid	PFHpS	375-92-8
	Perfluorooctanesulfonic acid	PFOS	1763-23-1
	Perfluorononanesulfonic acid	PFNS	68259-12-1
	Perfluorodecanesulfonic acid	PFDS	335-77-3
	Perfluorododecanesulfonic acid	PFDoS	79780-39-5
Perfluoroalkyl carboxylic acids	Perfluorobutanoic acid	PFBA	375-22-4
	Perfluoropentanoic acid	PFPeA	2706-90-3
	Perfluorohexanoic acid	PFHxA	307-24-4
	Perfluoroheptanoic acid	PFHpA	375-85-9
	Perfluorooctanoic acid	PFOA	335-67-1
	Perfluorononanoic acid	PFNA	375-95-1
	Perfluorodecanoic acid	PFDA	335-76-2
	Perfluoroundecanoic acid	PFUnA	2058-94-8
	Perfluorododecanoic acid	PFDoA	307-55-1
	Perfluorotridecanoic acid	PFTrDA	72629-94-8
	Perfluorotetradecanoic acid	PFTeDA	376-06-7
Per- and Polyfluoroether carboxylic acids	Hexafluoropropylene oxide dimer acid	HFPO-DA	13252-13-6
	4,8-Dioxa-3H-perfluorononanoic acid	ADONA	919005-14-4
	Perfluoro-3-methoxypropanoic acid	PFMPA	377-73-1
	Perfluoro-4-methoxybutanoic acid	PFMBA	863090-89-5
	Nonafluoro-3,6-dioxaheptanoic acid	NFDHA	151772-58-6
Fluorotelomer sulfonic acids	4:2 Fluorotelomer sulfonic acid	4:2-FTS	757124-72-4
	6:2 Fluorotelomer sulfonic acid	6:2-FTS	27619-97-2
	8:2 Fluorotelomer sulfonic acid	8:2-FTS	39108-34-4
Fluorotelomer carboxylic acids	3:3 Fluorotelomer carboxylic acid	3:3 FTCA	356-02-5
	5:3 Fluorotelomer carboxylic acid	5:3 FTCA	914637-49-3
	7:3 Fluorotelomer carboxylic acid	7:3 FTCA	812-70-4
Perfluorooctane sulfonamides	Perfluorooctane sulfonamide	PFOSA	754-91-6
	N-methylperfluorooctane sulfonamide	NMeFOSA	31506-32-8
	N-ethylperfluorooctane sulfonamide	NEtFOSA	4151-50-2

Perfluorooctane sulfonamidoacetic acids	N-methylperfluorooctane sulfonamidoacetic acid	N-MeFOSAA	2355-31-9
	N-ethylperfluorooctane sulfonamidoacetic acid	N-EtFOSAA	2991-50-6
Perfluorooctane sulfonamide ethanols	N-methylperfluorooctane sulfonamidoethanol	MeFOSE	24448-09-7
	N-ethylperfluorooctane sulfonamidoethanol	EtFOSE	1691-99-2
Ether sulfonic acids	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (F-53B Major)	9Cl-PF3ONS	756426-58-1
	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (F-53B Minor)	11Cl-PF3OUdS	763051-92-9
	Perfluoro(2-ethoxyethane) sulfonic acid	PFEESA	113507-82-7

The laboratory reporting limits for PFAS are 2 nanograms per liter (ng/L) in aqueous samples and 1 microgram per kilogram (µg/kg) in soil samples. The laboratory SOP for PFAS analysis and PFAS compound sampling protocol are provided in Attachment E.

Soil samples analyzed for 1,4-dioxane will be analyzed via USEPA method 8270, and groundwater samples will be analyzed by USEPA Method 8270 SIM. The laboratory reporting limits for 1,4-dioxane are 0.15 micrograms per liter (µg/L) in aqueous samples and 0.08 milligrams per kilogram (mg/kg) in soil samples.

5.6 Sample Preservation

Sample preservation measures will be used in an attempt to prevent sample decomposition by contamination, degradation, biological transformation, chemical interactions and other factors during the time between sample collection and analysis. Preservation will commence at the time of sample collection and will continue until analyses are performed. Should chemical preservation be required, the analytical laboratory will add the preservatives to the appropriate sample containers before shipment to the office or field. Samples will be preserved according to the requirements of the specific analytical method selected, as shown in Attachment D.

5.7 Sample Shipment

5.7.1 Packaging

Air sample canisters can be stored and transported without additional packaging. Soil sample containers will be placed in plastic coolers. Ice in Ziploc® bags (or equivalent) will be placed around sample containers. PFAS samples will be stored in separate coolers, and blue ice will not be used to cool PFAS samples. Cushioning material will be added around the sample containers if necessary. Chains-of-custody and other paperwork will be placed in a Ziploc® bag (or equivalent) and placed inside the cooler. The cooler will be taped closed and custody seals will

be affixed to one side of the cooler at a minimum. If the samples are being shipped by an express delivery company (e.g. FedEx) then laboratory address labels will be placed on top of the cooler.

5.7.2 Shipping

Standard procedures to be followed for shipping environmental samples to the analytical laboratory are outlined below.

- All efforts will be made to transport environmental samples to the laboratory within 24 hours from the time of collection by a laboratory-provided courier or express delivery company (e.g. FedEx) under the chain-of-custody protocols described in Section 5.9.
- Prior notice will be provided to the laboratory regarding when to expect shipped samples. If the number, type or date of shipment changes due to site constraints or program changes, the laboratory will be informed.

5.8 Decontamination Procedures

Decontamination procedures will be used for non-dedicated sampling equipment. Decontamination of field personnel is discussed in the site-specific Construction Health and Safety Plan (CHASP) included as an Appendix to the SMP. Field sampling equipment that is to be reused will be decontaminated in the field in accordance with the following procedures:

1. Laboratory-grade glassware detergent and tap water scrub to remove visual contamination
2. Generous tap water rinse
3. Distilled/de-ionized water rinse

Sample equipment used to collect PFAS samples will be decontaminated via a standard two step decontamination procedure using PFAS-free water. Decontamination water will be verified to be PFAS-free via laboratory analysis or certification in accordance with NYSDEC's "Guidance for Sampling, Analysis, and Assessment of PFAS Under NYSDEC's Part 375 Remedial Programs" (April 2023).

5.9 Residuals Management

Debris (e.g., paper, plastic and disposable PPE) will be collected in plastic garbage bags and disposed of as non-hazardous industrial waste. Debris is expected to be transported to a local municipal landfill for disposal.

Residual fluids (such as dewatering fluids) will be collected by pumping into a dedicated DOT-approved (or equivalent) vehicle for transport and off-site disposal. The residual fluids will be disposed of off-site in accordance with applicable federal and state regulations. Residual fluids such as decontamination water may be discharged to the ground surface, however, if gross contamination is observed, the residual fluids will be collected, stored, and transported similar purge water or other residual fluids.

5.10 Chain of Custody Procedures

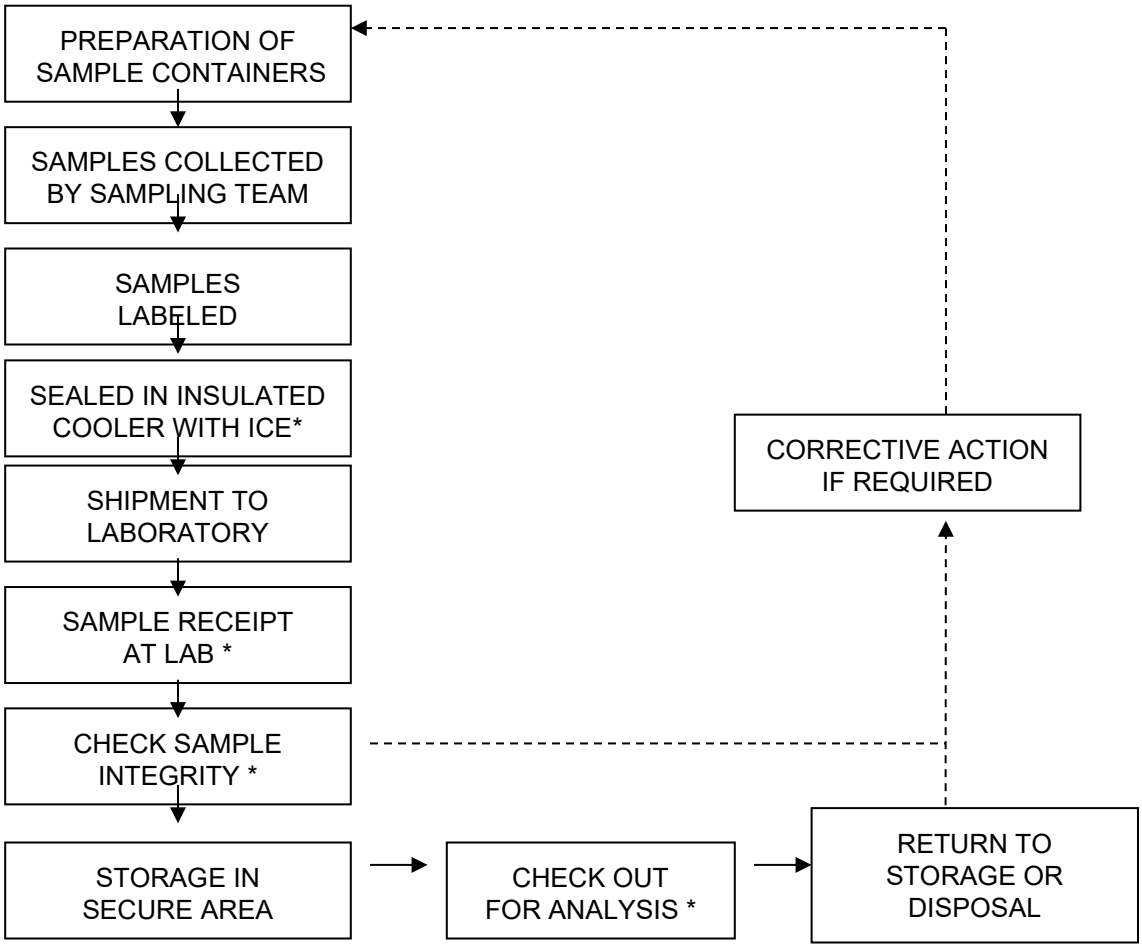
A chain-of-custody protocol has been established for collected samples that will be followed during sample handling activities in both field and laboratory operations. The primary purpose of the chain-of-custody procedures is to document the possession of the samples from collection through shipping, storage and analysis to data reporting and disposal. Chain-of-custody refers to actual possession of the samples. Samples are considered to be in custody if they are within sight of the individual responsible for their security or locked in a secure location. Each person who takes possession of the samples, except the shipping courier, is responsible for sample integrity and safe keeping. Chain-of-custody procedures are provided below:

- Chain-of-custody will be initiated by the laboratory supplying the pre-cleaned and prepared sample containers. Chain-of-custody forms will accompany the sample containers.
- Following sample collection, the chain-of-custody form will be completed for the sample collected. The sample identification number, date and time of sample collection, analysis requested and other pertinent information (e.g., preservatives) will be recorded on the form. All entries will be made in waterproof, permanent blue or black ink.
- Langan field personnel will be responsible for the care and custody of the samples collected until the samples are transferred to another party, dispatched to the laboratory, or disposed. The sampling team leader will be responsible for enforcing chain-of-custody procedures during field work.
- When the form is full or when all samples have been collected that will fit in a single cooler, the sampling team leader will check the form for possible errors and sign the chain-of-custody form. Any necessary corrections will be made to the record with a single strike mark, dated, and initialed.

Sample coolers will be accompanied by the chain-of-custody form, sealed in a Ziploc® bag (or equivalent) and placed on top of the samples or taped to the inside of the cooler lid. If applicable, a shipping bill will be completed for each cooler and the shipping bill number recorded on the chain-of-custody form.

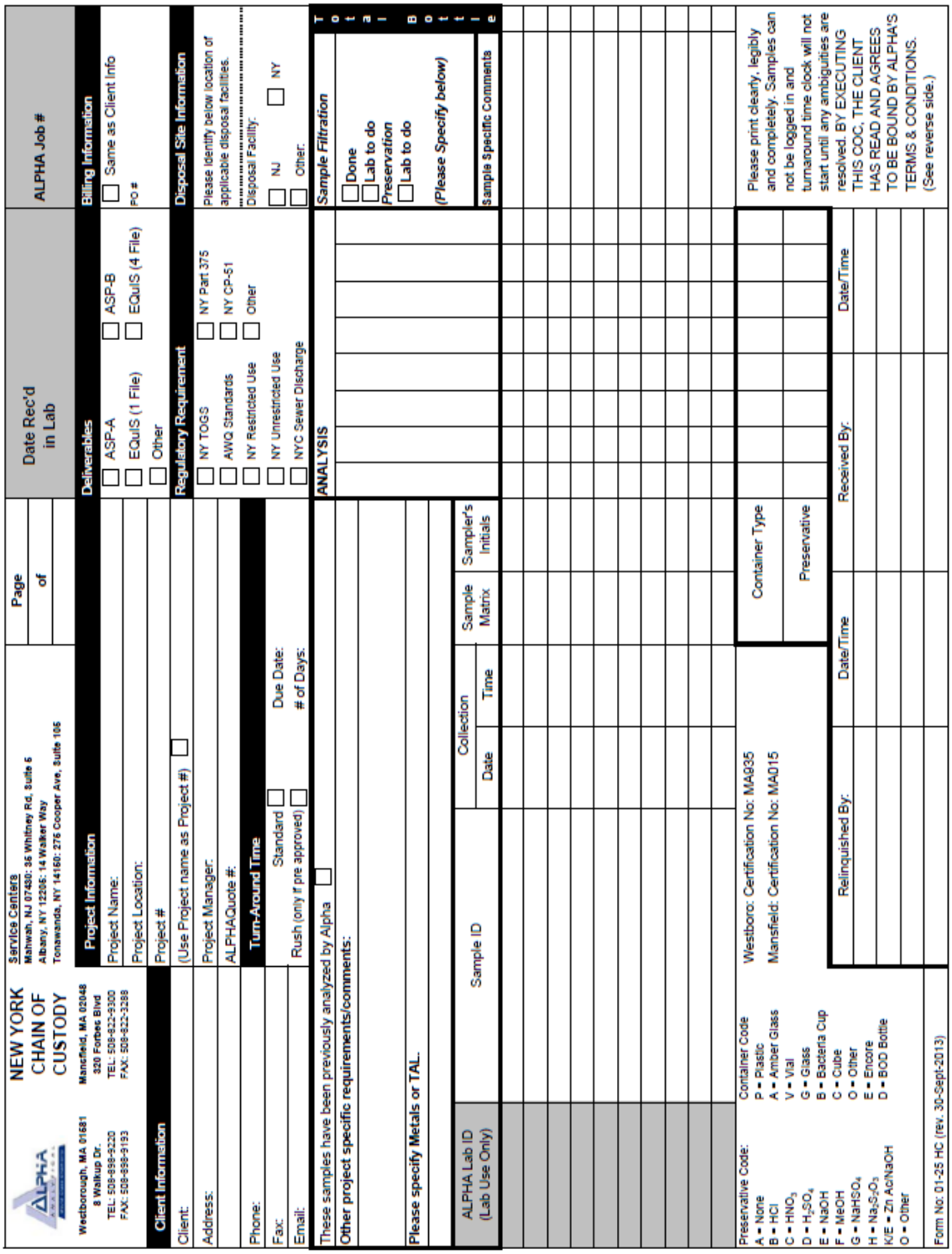
Samples will be packaged for shipment to the laboratory with the appropriate chain-of-custody form. A copy of the form will be retained by the sampling team for the project file and the original will be sent to the laboratory with the samples. Bills of lading will also be retained as part of the documentation for the chain-of-custody records, if applicable. When transferring custody of the samples, the individuals relinquishing and receiving custody of the samples will verify sample numbers and condition and will document the sample acquisition and transfer by signing and dating the chain-of-custody form. This process documents sample custody transfer from the sampler to the analytical laboratory. A flow chart showing a sample custody process is included as Figure 5.1, and a chain-of-custody form is included as Figure 5.2.

Figure 5-1 Sample Custody



* REQUIRES SIGN-OFF ON CHAIN-OF-CUSTODY FORM

Figure 5.2 Sample Chain-of-Custody Form



Laboratory chain-of-custody will be maintained throughout the analytical processes as described in the laboratory's Quality Assurance Manual. The analytical laboratory will provide a copy of the chain-of-custody in the analytical data deliverable package. The chain-of-custody becomes the permanent record of sample handling and shipment.

5.11 Laboratory Sample Storage Procedures

The subcontracted laboratory will use a laboratory information management system (LIMS) to track and schedule samples upon receipt by the analytical laboratories. Any sample anomalies identified during sample log-in must be evaluated on individual merit for the impact upon the results and the data quality objectives of the project. When irregularities do exist, the environmental consultant must be notified to discuss recommended courses of action and documentation of the issue must be included in the project file.

For samples requiring thermal preservation, the temperature of each cooler will be immediately recorded. Each sample and container will be will be assigned a unique laboratory identification number and secured within the custody room walk-in coolers designated for new samples. Samples will be, as soon as practical, disbursed in a manner that is functional for the operational team. The temperature of all coolers and freezers will be monitored and recorded using a certified temperature sensor. Any temperature excursions outside of acceptance criteria (i.e., below 2°C or above 6°C) will initiate an investigation to determine whether any samples may have been affected. Samples for VOCs will be maintained in satellite storage areas within the VOC laboratory. Following analysis, the laboratory's specific procedures for retention and disposal will be followed as specified in the laboratory's SOPs and/or QA manual.

6.0 DATA REDUCTION, VALIDATION, AND REPORTING

6.1 Introduction

Data collected as part of the remedial performance sampling will be reduced and reviewed by the laboratory QA personnel, and a report on the findings will be tabulated in a standard format. The criteria used to identify and quantify the analytes will be those specified for the applicable methods in the USEPA SW-846 and subsequent updates. The data package provided by the laboratory will contain all items specified in the USEPA SW-846 appropriate for the analyses to be performed, and be reported in standard format.

The completed copies of the chain-of-custody records (both external and internal) accompanying each sample from time of initial bottle preparation to completion of analysis shall be attached to the analytical reports.

6.2 Data Reduction

The Analytical Services Protocol (ASP) Category B data packages and an electronic data deliverable (EDD) will be provided by the laboratory after receipt of a complete sample delivery group. The Project Manager will immediately arrange for archiving the results and preparation of result tables. These tables will form the database for assessment of contamination conditions at the Site.

Each EDD deliverable must be formatted using a Microsoft Windows operating system and the NYSDEC data deliverable format for EQuIS. To avoid transcription errors, data will be loaded directly into the ASCII format from the laboratory information management system (LIMS). If this cannot be accomplished, the consultant should be notified via letter of transmittal indicating that manual entry of data is required for a particular method of analysis. All EDDs must also undergo a QC check by the laboratory before delivery. The original data, tabulations, and electronic media are stored in a secure and retrievable fashion.

The Project Manager or Task Manager will maintain close contact with the QA reviewer to ensure all non-conformance issues are acted upon prior to data manipulation and assessment routines. Once the QA review has been completed, the Project Manager may direct the Team Leaders or others to initiate and finalize the analytical data assessment.

6.3 Data Validation

Data validation will be performed in accordance with the USEPA validation guidelines for organic and inorganic data review. Validation will include the following:

- Verification of the QC sample results,
- Verification of the identification of sample results (both positive hits and non-detects),
- Recalculation of 10% of all investigative sample results, and
- Preparation of Data Usability Summary Reports (DUSR).

A DUSR will be prepared and reviewed by the QAO before issuance. The DUSR will present the results of data validation, including a summary assessment of laboratory data packages, sample preservation and COC procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness for each analytical method. A detailed assessment of each SDG will follow. For each of the organic analytical methods, the following will be assessed:

- Holding times;
- Instrument tuning;
- Instrument calibrations;
- Blank results;
- System monitoring compounds or surrogate recovery compounds (as applicable);
- Internal standard recovery results;
- MS and MSD results;
- Target compound identification;
- Chromatogram quality;
- Pesticide cleanup (if applicable);
- Compound quantitation and reported detection limits;
- System performance; and
- Results verification.

For each of the inorganic compounds, the following will be assessed:

- Holding times;
- Calibrations;
- Blank results;
- Interference check sample;
- Laboratory check samples;
- Duplicates;
- Matrix Spike;
- Furnace atomic absorption analysis QC;
- ICP serial dilutions; and
- Results verification and reported detection limits.

Based on the results of data validation, the validated analytical results reported by the laboratory will be assigned one of the following usability flags:

- "U" - Not detected. The associated number indicates the approximate sample concentration necessary to be detected significantly greater than the level of the highest associated blank;
- "UJ" - Not detected. Quantitation limit may be inaccurate or imprecise;
- "J" - Analyte is present. Reported value may be associated with a higher level of uncertainty than is normally expected with the analytical method
- "N" – Tentative identification. Analyte is considered present in the sample;
- "R" – Unreliable result; data is rejected or unusable. Analyte may or may not be present in the sample; and
- No Flag - Result accepted without qualification.

6.3 Reporting

Upon receipt of validated analytical results, NYSDEC format EDDs, compatible with EQuIS, will be prepared and submitted to the NYSDEC.

7.0 QUALITY ASSURANCE PERFORMANCE AUDITS AND SYSTEM AUDITS

7.1 Introduction

Quality assurance audits may be performed by the project quality assurance group under the direction and approval of the QAO. These audits will be implemented to evaluate the capability and performance of project and subcontractor personnel, items, activities, and documentation of the measurement system(s). Functioning as an independent body and reporting directly to corporate quality assurance management, the QAO may plan, schedule, and approve system and performance audits based upon procedures customized to the project requirements. At times, the QAO may request additional personnel with specific expertise from company and/or project groups to assist in conducting performance audits. However, these personnel will not have responsibility for the project work associated with the performance audit.

7.2 System Audits

System audits may be performed by the QAO or designated auditors, and encompass a qualitative evaluation of measurement system components to ascertain their appropriate selection and application. In addition, field and laboratory quality control procedures and associated documentation may be system audited. These audits may be performed once during the performance of the project. However, if conditions adverse to quality are detected or if the Project Manager requests, additional audits may be performed.

7.3 Performance Audits

The laboratory may be required to conduct an analysis of Performance Evaluation samples or provide proof that Performance Evaluation samples submitted by USEPA or a state agency have been analyzed within the past twelve months.

7.4 Formal Audits

Formal audits refer to any system or performance audit that is documented and implemented by the QA group. These audits encompass documented activities performed by qualified lead auditors to a written procedure or checklists to objectively verify that quality assurance requirements have been developed, documented, and instituted in accordance with contractual and project criteria. Formal audits may be performed on project and subcontractor work at various locations.

Audit reports will be written by auditors who have performed the site audit after gathering and evaluating all data. Items, activities, and documents determined by lead auditors to be in noncompliance shall be identified at exit interviews conducted with the involved management. Non-compliances will be logged, and documented through audit findings, which are attached to and are a part of the integral audit report. These audit-finding forms are directed to management to satisfactorily resolve the noncompliance in a specified and timely manner.

The Project Manager has overall responsibility to ensure that all corrective actions necessary to resolve audit findings are acted upon promptly and satisfactorily. Audit reports must be

submitted to the Project Manager within fifteen days of completion of the audit. Serious deficiencies will be reported to the Project Manager within 24 hours. All audit checklists, audit reports, audit findings, and acceptable resolutions are approved by the QAO prior to issue. Verification of acceptable resolutions may be determined by re-audit or documented surveillance of the item or activity. Upon verification acceptance, the QAO will close out the audit report and findings.

8.0 CORRECTIVE ACTION

8.1 Introduction

The following procedures have been established to ensure that conditions adverse to quality, such as malfunctions, deficiencies, deviations, and errors, are promptly investigated, documented, evaluated, and corrected.

8.2 Procedure Description

When a significant condition adverse to quality is noted at site, laboratory, or subcontractor location, the cause of the condition will be determined and corrective action will be taken to preclude repetition. Condition identification, cause, reference documents, and corrective action planned to be taken will be documented and reported to the QAO, Project Manager, Field Team Leader and involved contractor management, at a minimum. Implementation of corrective action is verified by documented follow-up action.

All project personnel have the responsibility, as part of the normal work duties, to promptly identify, solicit approved correction, and report conditions adverse to quality. Corrective actions will be initiated as follows:

- When predetermined acceptance standards are not attained;
- When procedure or data compiled are determined to be deficient;
- When equipment or instrumentation is found to be faulty;
- When samples and analytical test results are not clearly traceable;
- When quality assurance requirements have been violated;
- When designated approvals have been circumvented;
- As a result of system and performance audits;
- As a result of a management assessment;
- As a result of laboratory/field comparison studies; and
- As required by USEPA SW-846, and subsequent updates, or by the NYSDEC ASP.

Project management and staff, such as field investigation teams, remedial response planning personnel, and laboratory groups, monitor on-going work performance in the normal course of daily responsibilities. Work may be audited at the sites, laboratories, or contractor locations. Activities, or documents ascertained to be noncompliant with quality assurance requirements will be documented. Corrective actions will be mandated through audit finding sheets attached to the audit report. Audit findings are logged, maintained, and controlled by the Task Manager.

Personnel assigned to quality assurance functions will have the responsibility to issue and control Corrective Action Request (CAR) Forms (Figure 12.1 or similar). The CAR identifies the out-of-compliance condition, reference document(s), and recommended corrective action(s) to be

administered. The CAR is issued to the personnel responsible for the affected item or activity. A copy is also submitted to the Project Manager. The individual to whom the CAR is addressed returns the requested response promptly to the QA personnel, affixing his/her signature and date to the corrective action block, after stating the cause of the conditions and corrective action to be taken. The QA personnel maintain the log for status of CARs, confirms the adequacy of the intended corrective action, and verifies its implementation. CARs will be retained in the project file for the records.

Any project personnel may identify noncompliance issues; however, the designated QA personnel are responsible for documenting, numbering, logging, and verifying the close out action. The Project Manager will be responsible for ensuring that all recommended corrective actions are implemented, documented, and approved.

FIGURE 8.1

CORRECTIVE ACTION REQUEST

Number: _____ Date: _____

TO: _____

You are hereby requested to take corrective actions indicated below and as otherwise determined by you to (a) resolve the noted condition and (b) to prevent it from recurring. Your written response is to be returned to the project quality assurance manager by _____

CONDITION:

REFERENCE DOCUMENTS:

RECOMMENDED CORRECTIVE ACTIONS:

_____ _____ _____ _____ _____ _____

Originator Date Approval Date Approval Date

RESPONSE

CAUSE OF CONDITION

CORRECTIVE ACTION

(A) RESOLUTION

(B) PREVENTION

(C) AFFECTED DOCUMENTS

C.A. FOLLOWUP:

CORRECTIVE ACTION VERIFIED BY: _____ DATE:_____

9.0 REFERENCES

NYSDEC. Division of Environmental Remediation. DER-10/Technical Guidance for Site Investigation and Remediation, dated May 3, 2010.

NYSDEC. Guidance for Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs, dated April 2023.

NYSDOH. Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York, dated October 2006.

Taylor, J. K., 1987. Quality Assurance of Chemical Measurements. Lewis Publishers, Inc., Chelsea, Michigan

USEPA, 1986. SW-846 "Test Method for Evaluating Solid Waste," dated November 1986. U.S. Environmental Protection Agency, Washington, D.C.

USEPA, 1987. Data Quality Objectives for Remedial Response Actions Activities: Development Process, EPA/540/G-87/003, OSWER Directive 9355.0-7- U.S. Environmental Protection Agency, Washington, D.C.

USEPA, 2012. ICP-AES Data Validation. SOP No. HW-2a, Revisions 15, dated December 2012, USEPA Region II.

USEPA, 2012. ICP-MS Data Validation. SOP No. HW-2b, Revisions 15, dated December 2012, USEPA Region II.

USEPA, 2012. Mercury and Cyanide Data Validation. SOP No. HW-2c, Revisions 15, dated December 2012, USEPA Region II.USEPA. Hazardous Waste Support Section. Analysis of Volatile Organic Compounds in Air Contained in Canisters by Method TO-15. SOP No. HW-31, Revision #6, dated June 2014.

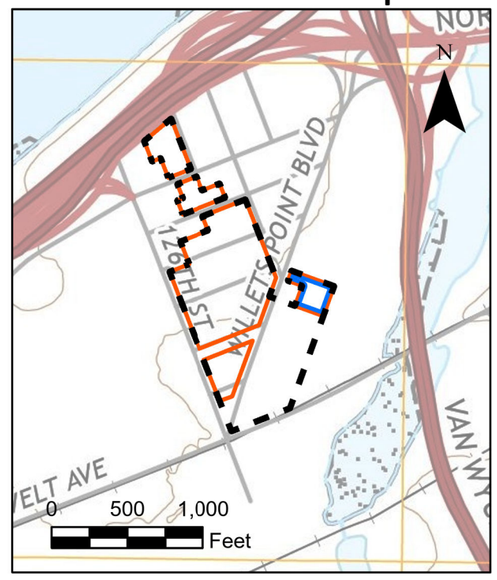
ATTACHMENT A

SITE LOCATION MAP

Legend

- Approximate BCP Site Boundary
- Former Willets Point Development BCP Site Boundary
- Former OU-2 Boundary
- Tax Lot

Reference Map



Notes:
1. Light Gray Canvas basemap provided through Langan's Esri and ArcGIS software licensing and ArcGIS Online.
2. Topographic basemap adapted from United States Geological Survey (USGS) 7.5-Minute Series Topographical Maps, Flushing, New York, Quadrangle.
3. Tax parcel data provided by the New York City Department of City Planning, MapPLUTO 23v2, and a survey prepared by Langan, July 28, 2023.

250 0 250
SCALE IN FEET

LANGAN
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Project	WILLETS POINT DEVELOPMENT L-PARCEL BCP SITE NO. C241146-H QUEENS NEW YORK
Figure Title	SITE LOCATION AND LAYOUT PLAN
Project No.	170197601
Date	11/1/2023
Scale	1"=250'
Drawn By	GS
Figure No.	1
	Figure 1 of 7

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Path: \\langan.com\data\NYC\data6\170197601\ArcGIS\APRX\170197601_SMP_FER\170197601_SMP_FER_SiteH.aprx Date: 11/1/2023 User: Gsajbel Time: 12:33 PM

ATTACHMENT B

RESUMES

WILLIAM BOHRER, PG

PROJECT GEOLOGIST

GEOLOGIST

Mr. Bohrer is an experienced geologist responsible for managing Langan's environmental standards and Health and Safety compliance for projects throughout New York City. His services include dissemination of environmental protocols, troubleshooting at project sites, in-house/field training, and maintenance of quality standards across the environmental discipline. Mr. Bohrer has a diverse and extensive background in geophysics, hydrogeology, mining and petroleum, and geotechnical engineering. He has developed conceptual site models for public, industrial and commercial facilities nationwide.

SELECTED PROJECTS

- NYU Poly – 122 Johnson Street, Brooklyn, NY
- Con Edison of New York at Governor's Island, NY, NY
- 535 4th Avenue, Brooklyn, NY
- 27 Wooster Street, New York, NY
- 42 West Street, Brooklyn, NY
- 455 West 19th Street, New York, NY
- Kings Plaza Mall, Brooklyn, NY
- Hudson Yards "Terra Firma", New York, NY
- Hudson Yards, Platform Special Inspection, New York, NY
- PSAC II, Bronx, NY
- 595-647 Smith Street, Brooklyn, NY
- New York University, 7-13 Washington Square North Investigation, New York, NY
- NYU 4 Washington Square Village, New York, NY
- 125th Street and Lenox Avenue, New York, NY
- Sullivan Street Development, New York, NY
- Hudson Crossing II, New York, NY
- New York Aquarium, Shark Tank & Animal Care Facility, Brooklyn, NY
- 209-219 Sullivan Street, New York, NY
- 261 Hudson Street, New York, NY
- 460 Washington Street, New York, NY
- 552 West 24th Street, New York, NY
- Brooklyn Bridge Park Pier 1, New York, NY
- International Leadership Bronx Charter School, Bronx, NY
- 203 East 92nd Street, New York, NY
- HighLine 28-29, New York, NY
- 539 Smith Street Bulkhead, Brooklyn, NY
- Willets Point, Corona, NY
- Plume Migration and Fracture Flow Aquifer Investigation, Brunswick, MD
- Plume Migration and Fracture Flow Aquifer Investigation, Fallston, MD
- Emergency Response Site Investigation & Remediation, Wappingers Falls, NY
- Emergency Response Site Investigation & Remediation, Allentown, PA

EDUCATION

Post Graduate Studies in Geophysics
Cornell University

B.S., Geology
Tufts University

PROFESSIONAL REGISTRATION

Professional Geologist (PG) in NY

40 Hour OSHA HazWOPER

OSHA Construction Safety & Health

OSHA Supervisory Certification
Credential (TWIC)

Transportation Worker Identification

NYS DEC- Protecting New York's Natural Resources with Better Construction Site Management

AFFILIATIONS

American Association of Petroleum Geologists

National Groundwater Association

Geological Society of America

LANGAN

- Emergency Response Site Investigation & Remediation, Shamokin, PA
- Bermuda International Airport, Jet Fuel Release Investigation, Bermuda
- Little Missouri River Basin, Geotechnical Site Evaluation (Horizontal Drilling Pipeline Install), ND
- Seismic Susceptibility Evaluation (Class 2 Injection Wells), Litchfield, OH
- Bedrock Mapping, Bradford and Sullivan Counties, PA
- Soil Solidification, Carteret, NJ

PA Council of Professional Geologists

JASON J. HAYES, PE, LEED AP

PRINCIPAL/VICE PRESIDENT

ENVIRONMENTAL ENGINEERING

Mr. Hayes has experience in New York, New Jersey, Washington D.C., California, Washington, Oregon, Alaska, and Internationally. His experience includes Environmental Protection Agency (EPA), New York State (NYS) Brownfields applications, investigation, and remediation; New York City Department of Environmental Protection (NYCDEP) and New York City Office of Environmental Remediation (OER) E-designated site applications, investigations, and remediation. His expertise also includes Phase I and II Environmental Site Investigations and Assessments; contaminated building cleanup and demolition; Underground Storage Tank (UST) permitting, removal specifications, and closure reporting; soil vapor intrusion investigation and mitigation system design (depressurization systems, etc.); development of groundwater contaminant plume migration models; environmental analysis; and oversight, design and specification generation for remediation operations with contaminants of concern to include polychlorinated biphenyls (PCBs), solvents, mercury, arsenic, petroleum products, asbestos, mold and lead.

SELECTED PROJECTS

- NYCDPR Bushwick Inlet Park (Phase I ESA, Approvals for NYC E-Designation), Brooklyn, NY
- WCS New York Aquarium, Shark Tank and Animal Care Facility (Environmental Remediation), Coney Island, NY
- NYC School Construction Authority (PCB Remediation), Various Locations, New York, NY
- 28-29 High Line (Phase I ESA, Phase II ESI, and Environmental Remediation), New York, NY
- Georgetown Heating Plant (Phase II ESI and Remedial Design for Mercury Impacted Site), Washington D.C.
- 268 West Street (BCP Application, RI and RIWP), New York, NY
- Confidential Multiple Mixed-Use Tower Location (BCP Application, RI, Phase I ESA, and Phase II ESI), New York, NY
- Dock 72 at Brooklyn Navy Yard, (NYS Voluntary Cleanup Program), Brooklyn, NY
- 27-21 44th Drive (BCP Application, Remedial Investigation Phase I ESA, and Phase II ESI), Long Island City, NY
- Purves Street Development, BCP Application, RAWP, and Phase II ESI, Long Island City, NY
- 267-273 West 87th Street (BCP Application, Remedial Investigation, RIWP, RAWP), New York, NY
- International Leadership Charter School (Environmental Remediation), Bronx, NY
- West & Watts (BCP Application), New York, NY
- Hudson Yards Redevelopment (Phase I ESA and Phase II ESI), New York, NY
- 627 Smith Street (RI and Report), Brooklyn, NY

EDUCATION

M.S., Environmental Engineering
Columbia University

B.S., Chemistry, Environmental Toxicology (Business Administration minor)
Humboldt State University

PROFESSIONAL REGISTRATION

Professional Engineer (PE) in NY

LEED Accredited Professional (LEED AP)

Troxler Certification for Nuclear Densometer Training

OSHA 40-Hour HAZWOPER

OSHA HAZWOPER Site Supervisor

AFFILIATIONS

US Green Building Council, NYC Chapter, Communications Committee

Urban Land Institute (ULI), member

Commercial Real Estate Development Associations (NAIOP), member

LANGAN

- Gateway Center II Retail (Phase I ESA and Phase II ESI), Brooklyn, NY
- 261 Hudson Street (Phase I ESA, Phase II ESI, BCP, and RAWP), New York, NY
- Riverside Center, Building 2 (BCP, Phase I ESA and Phase II ESI), New York, NY
- New York Police Academy, (Sub-Slab Depressurization and Vapor Barrier System), College Point, NY
- Bronx Terminal Market (BCP, RIWP, RAWP, Phase I ESA and Phase II ESI), Bronx, NY
- Jacob Javits Convention Center (Phase I ESA and Phase II ESI), New York, NY
- Yankee Stadium Development Waterfront Park (NYSDEC Spill Sites), Bronx, NY
- Silvercup West (BCP, RIWP, RIR, RAWP, and RAA), Long Island City, NY
- 29 Flatbush, Tall Residential Building (Groundwater Studies, RIR and RAWP), Brooklyn, NY
- Gowanus Village I (BCP, RIWP and RIR), Brooklyn, NY
- Sullivan Street Hotel (Site Characterization Study and Owner Representation), New York, NY
- Riker's Island Co-Generation Plant (Soil and Soil Vapor Quality Investigations), Bronx, NY
- The Shops at Atlas Park (Sub-Slab Depressurization and Vapor Barrier Design), Glendale, NY
- Memorial Sloan-Kettering Cancer Center (Subsurface and Soil Vapor Intrusion Investigations), New York, NY
- Element West 59th Street (Oversight and Monitoring of Sub-Slab Depressurization and Vapor Barrier Systems), New York, NY
- Teterboro Airport (Delineation and Remedial Oversight of Petroleum-Contaminated Soils), Teterboro, NJ
- Proposed New York JETS Stadium (Phase I ESA), New York, NY
- Former Con Edison Manufactured Gas Plant Sites (Research Reports), New York, NY
- 7 World Trade Center (Endpoint Sampling and Final Closure Report), New York, NY
- Peter Cooper Village, Environmental Subsurface Investigations, New York, NY
- Greenpoint Terminal Market (BCP), Brooklyn, NY
- Confidential Location (Remediation for Mercury-Contaminated Site), New York, NY
- Confidential Location (Phase II ESI and Remedial Design for Mercury Impacted Site), Brooklyn, NY

NYC Brownfield Partnership, member

SELECTED PUBLICATIONS, REPORTS, AND PRESENTATIONS

NYC Mayor's Office of Environmental Remediation – Big Apple Brownfield Workshop – Presented on Soil Vapor Intrusion Remedies (e.g., SSD Systems, Vapor Barriers, Modified HVAC)

New York City Brownfield Partnership – Presented on environmental considerations and complications of the Hudson Yards Development

Waterfront Development Technical Course – Presented on Impacted Waterfront Planning Considerations

GERALD F. NICHOLLS, PE, CHMM

ASSOCIATE

ENVIRONMENTAL ENGINEERING & HAZARDOUS MATERIALS MANAGMENT

Mr. Nicholls' 19 years of expertise includes management of remediation and site investigations, litigation support, brownfield cleanups, remedial design, industrial hygiene, air monitoring and environmental health and safety projects including data collection, inspection and reporting for projects throughout New York and New Jersey. He works closely with various private, state, commercial, industrial, and municipal clients, acting as a liaison between the client and project team.

In 2019, Real Estate Weekly named Mr. Nicholls one of the Rising Stars of Real Estate.

SELECTED PROJECTS

- 491 Wortman Ave, Air Sparge/Soil Vapor Extraction Design and Implementation, Brownfield Cleanup Program, Bid Documents, Construction Administration, Brooklyn, NY
- Whitehead Realty, Acme Sites, DNAPL Delineation, Site Characterization, Remedial Investigation and Reporting, Brooklyn, NY
- West 17th Street Development, DNAPL Assessment, DNAPL Recovery, Remedial Design, Closure through Brownfield Cleanup Program, Remediation Oversight, Bid Documents, ISS and Containment Wall Design, Construction Administration, New York, NY
- 2 Ingraham Street, Brooklyn, NY
- New York City School Construction Authority On-Call Contract for Hazmat Consulting Services, Various Locations, Five Boroughs of New York, NY
- G4 Capital third party due diligence reviews and environmental risk evaluations, Various Locations, New York, NY
- 140 6th Avenue, Sub-Membrane Depressurization System Design, Spill Remediation, Subslab Remediation and Monitoring Well Piping Design, Remediation Oversight, and Construction Administration, New York, NY
- Gowanus Canal Northside, Demolition and Decommissioning of MOSF, Remediation Investigation, Brownfield Cleanup Program, Brooklyn, NY
- 23-01 42nd Road, Phase I, Phase II Remedial Investigation, Remedial Action Work Plan, Sub-Membrane Depressurization System Design, Underground Storage Tank Closure and Remediation, Brownfield Cleanup Program, Remediation Oversight, Construction Administration, Long Island City, NY
- 23-10 Queens Plaza South, Phase I, Phase II Remedial Investigation, Remedial Action Work Plan, Sub-Membrane Depressurization System Design, Underground Storage Tank Closure and Remediation, Brownfield Cleanup Program, Remediation Oversight, Construction Administration, Long Island City, NY

EDUCATION

M.S., Environmental Engineering
New Jersey Institute of Technology

B.S., Chemistry and Environmental Studies (Double Major)
Ursinus College

PROFESSIONAL REGISTRATION

Professional Engineer (PE) in NY

Certified Hazardous Materials Manager (CHMM)

AFFILIATIONS

Real Estate Board New York

City of Jersey City Environmental Commission, Former Commissioner, Vice Chair and Chair

Alliance of Hazardous Materials Professionals

American Chemical Society

New York League of Conservation Voters

New York City Brownfield Partnership

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- 163 6th Street, Phase I and Phase II Due Diligence, Spill Response, Remedial Action Work Plan, Brooklyn, NY
- 170 Amsterdam Avenue, Remedial Action Work Plan, Voluntary Cleanup Program, Remediation Oversight, Construction Administration, New York, NY
- Urban Health Plan, Medical Building, DNAPL Delineation, Remedial Action Work Plan, Hazardous Waste Management and Minimization, Brownfield Cleanup Program, Bronx, NY
- Second Avenue Subway, Air Monitoring and Ventilated Air Treatment Program, New York, NY
- New York University Spill Sites, 4 Washington Square Village, 7-13, Washington Square North, and 251 Mercer Street, Fuel Oil Spill Cleanup and Closure, New York, NY
- Dormitory Authority of New York (DASNY), City College of New York, Fuel Protection and Leak Detection System Repair and Upgrades, New York, NY
- 45 Broad Street, Waste Characterization, Construction Documents, New York, NY
- 241 West 28th Street, New York, NY
- Surfactant Remediation Project, In-Situ Chemical Oxidation Design and Implementation and Site Closure, Margate City, NJ
- Koppers Site, Trans-Hudson Express Project, Kearny, NJ
- Former Cornell Manufacturing Site, Orangeburg, NY
- Horse Pasture Site, Robins Air Force Base, GA
- Williams Air Force Base, Thermal Enhanced Extraction, Mesa, AZ
- New Jersey Transit, 32nd Street Station Stop (former Hicor Site), Bayonne, NJ
- Nikolski Radio Relay Station, Umnak Island, AK
- Middletown Post Office, Due Diligence, Middletown, NY
- Lower Manhattan Construction Command Center, Environmental Services Contract, New York, NY
- Da Nang International Airport, Da Nang, Vietnam
- 22nd to 8th Street Station Light Rail Extension, Bayonne, NJ
- 69th Street Grade Separation Project, North Bergen, NJ
- Dukes Parkway Landfill, Hillsboro/Manville, NJ
- NYU Langone Medical Center, New Science Building, Remediation Oversight and Construction Administration, Voluntary Cleanup Program, New York, NY
- 86 Warren Street, Waste Characterization and Construction Documents, New York, NY
- 459 Smith Street, Due Diligence and Cost Estimating, Brooklyn, NY
- 111 Leroy Street, New York, NY
- 411 Broadway, Phase I, Remedial Investigation, Air/Noise Coordination for E-Designation, New York, NY
- Modera on the Hudson, Remediation Oversight, Remedial Action Work Plan, Submembrane Depressurization System Design, Yonkers, NY
- Honeywell Quanta, Remedial Design Peer Review, Edgewater, NJ
- New York University Tandon School of Engineering (Spill 1009933), Remediation, Laser-Induced Fluorescence Investigation, Remedial System Optimization, Product Recovery, Spill Cleanup, Brooklyn, NY
- 237-261 North 9th Street, Peer Review and Due Diligence, Brooklyn, NY

SELECTED PUBLICATIONS, REPORTS, AND PRESENTATIONS

Burke, M., Ciambruschini, S., Nicholls, G., Tashji, A., Vaidya, S., “Redeveloping a Remediated MGP Site”, MGP Symposium 2019, Atlantic City, NJ.

”Biodegradation Pathways and End Products of Sodium Dioctyl Sulfosuccinate/Sodium Hexadecyl Diphenyl Oxide Disulfonate Surfactant Solution.” Florida Remediation Conference, Orlando, Florida, November 2005.

JOSEPH CONBOY

STAFF CHEMIST

ENVIRONMNETAL

Mr. Conboy has seven years of environmental chemistry, quality assurance, and environmental database management experience, with a current emphasis on validation of laboratory data for submittal to NJDEP via the New Jersey Data of Known Quality Protocols and to NYSDEC. Previous work experience includes performing validation of data for projects in USEPA Regions 2 and 3 while employing appropriate validation guidelines for each region, managing large data sets, updating appropriate regulatory limits, performing statistical evaluations, and preparing electronic data deliverables and report deliverables using the Earthsoft EQuIS database program, and acted as an intermediary between project managers, field staff, and laboratories. Mr. Conboy also has experience in field sampling techniques and maintains current OSHA HAZWOPER certification.

EDUCATION

B.Sc., Chemistry with a minor in Mathematics
Rowan University

CERTIFICATIONS & TRAINING

OSHA 40-Hour HAZWOPER 29 CFR 1910.120(e)(4) Certification

NJ Analytical Guidance and Data Usability Training

USEPA Data Validation Training

Earthsoft EQuIS Environmental Database Training

SELECTED PROJECTS

- 1400 Ferris, Bronx, NY – Completed validation of soil and groundwater data and prepared the Data Usability Summary Report for submittal to NYSDEC. USEPA Region II guidelines, with aide from National Functional Guidelines, were employed to perform validation of VOCs and SVOCs including 1,4-dioxane, and tangentially used based on professional judgment to perform validation of PFAS data.
- Broome Street Parking Lot, NY - Completed validation of waste characterization data and prepared the Data Usability Summary Report for submittal to NYSDEC. USEPA Region II guidelines, with aide from National Functional Guidelines, were employed to perform validation of VOCs, SVOCs, herbicides, PCBs, pesticides, metals including mercury, ignitability temperature, pH, reactive cyanide, reactive sulfide, cyanide, and hexavalent chromium. Toxicity characteristic leachate procedure extraction data for VOCs, SVOCs, herbicides, pesticides, metals, and mercury were also validated.
- 215 North 10th Street, Brooklyn, NY - Completed validation of soil and groundwater data and prepared the Data Usability Summary Report for submittal to NYSDEC. USEPA Region II guidelines, with aide from National Functional Guidelines, were employed to perform validation of VOC, SVOC, SVOC SIM, herbicide, PCB, pesticide, metals, mercury, cyanide, hexavalent chromium, trivalent chromium data.
- 35 Commercial Street, Brooklyn, NY - Completed validation of soil data and prepared the Data Usability Summary Report for submittal to NYSDEC. USEPA Region II guidelines, with aide from National Functional Guidelines, were employed to perform validation of VOC, SVOC, SVOC SIM, herbicide, PCB, pesticide, metals, mercury, cyanide, hexavalent chromium, trivalent chromium data, and tangentially used based on professional judgment to perform validation of PFAS data.
- Suffolk Street, Lower East Side, NY- Completed validation of soil, groundwater, and soil vapor data and prepared the Data Usability Summary Report for submittal to NYSDEC. USEPA Region II

guidelines, with aide from National Functional Guidelines, were employed to perform validation of VOC, VOCs by USEPA TO-15, SVOC, SVOC SIM, herbicide, PCB, pesticide, metals, mercury, cyanide, hexavalent chromium, trivalent chromium data, and tangentially used based on professional judgment to perform validation of PFAS data.

- Managed a database for a confidential client containing 10+ years of environmental chemical data from multiple laboratories, requiring select data validation in accordance with New Jersey Data of Known Quality Protocols and identifying areas of delineation from historic field information. Once identified, NJDEP designated groundwater, surface water, soil, sediment, soil vapor, and custom screening criteria were researched and applied to each area, requiring individualized flagging for reporting.*
- Prepared the New Jersey Data of Known Quality Protocol Data Usability Evaluation and managed the database for a confidential client for a data set greater than 20 years old. A DUE or any validation effort was not prepared in the 20 years prior to current. This included data from variations of methods for volatile organic compounds, semivolatile organic compounds, total and dissolved metals, pesticides, herbicides, natural attenuation parameters, and per- and polyfluoroalkyl substances in multiple media.*
- Performed 200+ Stage 2a validations for a combined 87-acre USEPA designated Corrective Action site under the Resource Conservation and Recovery Act, including a quick-turn USEPA required PCB by soxhlet extraction investigation across multiple plants. Once a former train car painting facility, USEPA required a quick-turn PCB by soxhlet extraction soil investigation.
- Preparation of a quality assurance program for a confidential client in West Virginia. A quick turn QAPP was prepared in a service location new to the consultant, resulting in research into state requirements for data usability and auditing newly employed laboratories. The QAPP was understood to be prepared for groundwater only, but the client did not reveal the need for sediment and soil. Two QAPPs were submitted for review to governing agencies.*
- Used statistical software to determine a localized background upper confidence limit of chromium for a confidential client's sand and gravel site. Validation was used to confirm laboratory procedures, and data was used in ProUCL calculations to compare to researched background chromium levels for Pennsylvania soils. *
- Prepared daily perimeter dust and air monitoring summaries and validation of low level mirex data for a confidential client's superfund site. Low level mirex data was generated by university laboratories and subject to validation following national functional guidelines to aide in river clean-up, including sediment, surface water, and treatment system water matrices.*

**Project completed prior to employment at LANGAN.*

ATTACHMENT C

LABORATORY REPORTING LIMITS AND METHOD DETECTION LIMITS

ATTACHMENT B

SOIL SAMPLES
LABORATORY REPORTING LIMITS AND METHOD DETECTION LIMITS

Date Created: 03/19/24
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Langan Engineering & Environmental

TCL Volatiles - EPA 8260D/5035 High&Low (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - 1 Vial MeOH/2 Vial Water

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Methylene chloride	75-09-2	5	2.29	ug/kg	70-130	30	70-130	30	30			
1,1-Dichloroethane	75-34-3	1	0.145	ug/kg	70-130	30	70-130	30	30			
Chloroform	67-66-3	1.5	0.14	ug/kg	70-130	30	70-130	30	30			
Carbon tetrachloride	56-23-5	1	0.23	ug/kg	70-130	30	70-130	30	30			
1,2-Dichloropropane	78-87-5	1	0.125	ug/kg	70-130	30	70-130	30	30			
Dibromochloromethane	124-48-1	1	0.14	ug/kg	70-130	30	70-130	30	30			
1,1,2-Trichloroethane	79-00-5	1	0.267	ug/kg	70-130	30	70-130	30	30			
Tetrachloroethene	127-18-4	0.5	0.196	ug/kg	70-130	30	70-130	30	30			
Chlorobenzene	108-90-7	0.5	0.127	ug/kg	70-130	30	70-130	30	30			
Trichlorofluoromethane	75-69-4	4	0.695	ug/kg	70-139	30	70-139	30	30			
1,2-Dichloroethane	107-06-2	1	0.257	ug/kg	70-130	30	70-130	30	30			
1,1,1-Trichloroethane	71-55-6	0.5	0.167	ug/kg	70-130	30	70-130	30	30			
Bromodichloromethane	75-27-4	0.5	0.109	ug/kg	70-130	30	70-130	30	30			
trans-1,3-Dichloropropene	10061-02-6	1	0.273	ug/kg	70-130	30	70-130	30	30			
cis-1,3-Dichloropropene	10061-01-5	0.5	0.158	ug/kg	70-130	30	70-130	30	30			
1,3-Dichloropropene, Total	542-75-6	0.5	0.158	ug/kg				30	30			
1,1-Dichloropropene	563-58-6	0.5	0.159	ug/kg	70-130	30	70-130	30	30			
Bromoform	75-25-2	4	0.246	ug/kg	70-130	30	70-130	30	30			
1,1,2,2-Tetrachloroethane	79-34-5	0.5	0.166	ug/kg	70-130	30	70-130	30	30			
Benzene	71-43-2	0.5	0.166	ug/kg	70-130	30	70-130	30	30			
Toluene	108-88-3	1	0.543	ug/kg	70-130	30	70-130	30	30			
Ethylbenzene	100-41-4	1	0.141	ug/kg	70-130	30	70-130	30	30			
Chloromethane	74-87-3	4	0.932	ug/kg	52-130	30	52-130	30	30			
Bromomethane	74-83-9	2	0.581	ug/kg	57-147	30	57-147	30	30			
Vinyl chloride	75-01-4	1	0.335	ug/kg	67-130	30	67-130	30	30			
Chloroethane	75-00-3	2	0.452	ug/kg	50-151	30	50-151	30	30			
1,1-Dichloroethene	75-35-4	1	0.238	ug/kg	65-135	30	65-135	30	30			
trans-1,2-Dichloroethene	156-60-5	1.5	0.137	ug/kg	70-130	30	70-130	30	30			
Trichloroethene	79-01-6	0.5	0.137	ug/kg	70-130	30	70-130	30	30			
1,2-Dichlorobenzene	95-50-1	2	0.144	ug/kg	70-130	30	70-130	30	30			
1,3-Dichlorobenzene	541-73-1	2	0.148	ug/kg	70-130	30	70-130	30	30			
1,4-Dichlorobenzene	106-46-7	2	0.171	ug/kg	70-130	30	70-130	30	30			
Methyl tert butyl ether	1634-04-4	2	0.201	ug/kg	66-130	30	66-130	30	30			
p/m-Xylene	179601-23-1	2	0.56	ug/kg	70-130	30	70-130	30	30			
o-Xylene	95-47-6	1	0.291	ug/kg	70-130	30	70-130	30	30			
Xylene (Total)	1330-20-7	1	0.291	ug/kg				30	30			
cis-1,2-Dichloroethene	156-59-2	1	0.175	ug/kg	70-130	30	70-130	30	30			
1,2-Dichloroethene (total)	540-59-0	1	0.137	ug/kg				30	30			
Dibromomethane	74-95-3	2	0.238	ug/kg	70-130	30	70-130	30	30			
Styrene	100-42-5	1	0.196	ug/kg	70-130	30	70-130	30	30			
Dichlorodifluoromethane	75-71-8	10	0.915	ug/kg	30-146	30	30-146	30	30			
Acetone	67-64-1	10	4.811	ug/kg	54-140	30	54-140	30	30			

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Langan Engineering & Environmental

TCL Volatiles - EPA 8260D/5035 High&Low (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - 1 Vial MeOH/2 Vial Water

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Carbon disulfide	75-15-0	10	4.55	ug/kg	59-130	30	59-130	30	30			
2-Butanone	78-93-3	10	2.22	ug/kg	70-130	30	70-130	30	30			
Vinyl acetate	108-05-4	10	2.15	ug/kg	70-130	30	70-130	30	30			
4-Methyl-2-pentanone	108-10-1	10	1.28	ug/kg	70-130	30	70-130	30	30			
1,2,3-Trichloropropane	96-18-4	2	0.127	ug/kg	68-130	30	68-130	30	30			
2-Hexanone	591-78-6	10	1.18	ug/kg	70-130	30	70-130	30	30			
Bromochloromethane	74-97-5	2	0.205	ug/kg	70-130	30	70-130	30	30			
2,2-Dichloropropane	594-20-7	2	0.202	ug/kg	70-130	30	70-130	30	30			
1,2-Dibromoethane	106-93-4	1	0.279	ug/kg	70-130	30	70-130	30	30			
1,3-Dichloropropane	142-28-9	2	0.167	ug/kg	69-130	30	69-130	30	30			
1,1,1,2-Tetrachloroethane	630-20-6	0.5	0.132	ug/kg	70-130	30	70-130	30	30			
Bromobenzene	108-86-1	2	0.145	ug/kg	70-130	30	70-130	30	30			
sec-Butylbenzene	135-98-8	1	0.146	ug/kg	70-130	30	70-130	30	30			
tert-Butylbenzene	98-06-6	2	0.118	ug/kg	70-130	30	70-130	30	30			
o-Chlorotoluene	95-49-8	2	0.191	ug/kg	70-130	30	70-130	30	30			
p-Chlorotoluene	106-43-4	2	0.108	ug/kg	70-130	30	70-130	30	30			
1,2-Dibromo-3-chloropropane	96-12-8	3	0.998	ug/kg	68-130	30	68-130	30	30			
Hexachlorobutadiene	87-68-3	4	0.169	ug/kg	67-130	30	67-130	30	30			
Isopropylbenzene	98-82-8	1	0.109	ug/kg	70-130	30	70-130	30	30			
p-Isopropyltoluene	99-87-6	1	0.109	ug/kg	70-130	30	70-130	30	30			
Acrylonitrile	107-13-1	4	1.15	ug/kg	70-130	30	70-130	30	30			
n-Propylbenzene	103-65-1	1	0.171	ug/kg	70-130	30	70-130	30	30			
1,2,3-Trichlorobenzene	87-61-6	2	0.322	ug/kg	70-130	30	70-130	30	30			
1,2,4-Trichlorobenzene	120-82-1	2	0.272	ug/kg	70-130	30	70-130	30	30			
1,3,5-Trimethylbenzene	108-67-8	2	0.193	ug/kg	70-130	30	70-130	30	30			
1,2,4-Trimethylbenzene	95-63-6	2	0.334	ug/kg	70-130	30	70-130	30	30			
1,4-Dioxane	123-91-1	80	35.1	ug/kg	65-136	30	65-136	30	30			
1,4-Diethylbenzene	105-05-5	2	0.177	ug/kg	70-130	30	70-130	30	30			
4-Ethyltoluene	622-96-8	2	0.384	ug/kg	70-130	30	70-130	30	30			
1,2,4,5-Tetramethylbenzene	95-93-2	2	0.191	ug/kg	70-130	30	70-130	30	30			
Ethyl ether	60-29-7	2	0.341	ug/kg	67-130	30	67-130	30	30			
trans-1,4-Dichloro-2-butene	110-57-6	5	1.42	ug/kg	70-130	30	70-130	30	30			
1,2-Dichloroethane-d4	*17060-07-0*									*70-130*		
2-Chloroethoxyethane												
Toluene-d8	*2037-26-5*									*70-130*		
4-Bromofluorobenzene	*460-00-4*									*70-130*		
Dibromofluoromethane	*1868-53-7*									*70-130*		

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NYTCL Semivolatiles - EPA 8270E (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - Glass 250ml/8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Acenaphthene	83-32-9	133.6	17.3012	ug/kg	31-137	50	31-137	50	50			
1,2,4-Trichlorobenzene	120-82-1	167	19.1048	ug/kg	38-107	50	38-107	50	50			
Hexachlorobenzene	118-74-1	100.2	18.704	ug/kg	40-140	50	40-140	50	50			
Bis(2-chloroethyl)ether	111-44-4	150.3	22.6452	ug/kg	40-140	50	40-140	50	50			
2-Chloronaphthalene	91-58-7	167	16.5664	ug/kg	40-140	50	40-140	50	50			
1,2-Dichlorobenzene	95-50-1	167	29.9932	ug/kg	40-140	50	40-140	50	50			
1,3-Dichlorobenzene	541-73-1	167	28.724	ug/kg	40-140	50	40-140	50	50			
1,4-Dichlorobenzene	106-46-7	167	29.1582	ug/kg	28-104	50	28-104	50	50			
3,3'-Dichlorobenzidine	91-94-1	167	44.422	ug/kg	40-140	50	40-140	50	50			
2,4-Dinitrotoluene	121-14-2	167	33.4	ug/kg	40-132	50	40-132	50	50			
2,6-Dinitrotoluene	606-20-2	167	28.6572	ug/kg	40-140	50	40-140	50	50			
Fluoranthene	206-44-0	100.2	19.1716	ug/kg	40-140	50	40-140	50	50			
4-Chlorophenyl phenyl ether	7005-72-3	167	17.869	ug/kg	40-140	50	40-140	50	50			
4-Bromophenyl phenyl ether	101-55-3	167	25.4842	ug/kg	40-140	50	40-140	50	50			
Bis(2-chloroisopropyl)ether	108-60-1	200.4	28.5236	ug/kg	40-140	50	40-140	50	50			
Bis(2-chloroethoxy)methane	111-91-1	180.36	16.7334	ug/kg	40-117	50	40-117	50	50			
Hexachlorobutadiene	87-68-3	167	24.4488	ug/kg	40-140	50	40-140	50	50			
Hexachlorocyclopentadiene	77-47-4	477.62	151.302	ug/kg	40-140	50	40-140	50	50			
Hexachloroethane	67-72-1	133.6	27.0206	ug/kg	40-140	50	40-140	50	50			
Isophorone	78-59-1	150.3	21.6766	ug/kg	40-140	50	40-140	50	50			
Naphthalene	91-20-3	167	20.3406	ug/kg	40-140	50	40-140	50	50			
Nitrobenzene	98-95-3	150.3	24.716	ug/kg	40-140	50	40-140	50	50			
NitrosoDiPhenylAmine(NDPA)/DPA	86-30-6	133.6	19.0046	ug/kg	36-157	50	36-157	50	50			
n-Nitrosodi-n-propylamine	621-64-7	167	25.7848	ug/kg	32-121	50	32-121	50	50			
Bis(2-Ethylhexyl)phthalate	117-81-7	167	57.782	ug/kg	40-140	50	40-140	50	50			
Butyl benzyl phthalate	85-68-7	167	42.084	ug/kg	40-140	50	40-140	50	50			
Di-n-butylphthalate	84-74-2	167	31.6632	ug/kg	40-140	50	40-140	50	50			
Di-n-octylphthalate	117-84-0	167	56.78	ug/kg	40-140	50	40-140	50	50			
Diethyl phthalate	84-66-2	167	15.4642	ug/kg	40-140	50	40-140	50	50			
Dimethyl phthalate	131-11-3	167	35.07	ug/kg	40-140	50	40-140	50	50			
Benzo(a)anthracene	56-55-3	100.2	18.8042	ug/kg	40-140	50	40-140	50	50			
Benzo(a)pyrene	50-32-8	133.6	40.748	ug/kg	40-140	50	40-140	50	50			
Benzo(b)fluoranthene	205-99-2	100.2	28.1228	ug/kg	40-140	50	40-140	50	50			
Benzo(k)fluoranthene	207-08-9	100.2	26.72	ug/kg	40-140	50	40-140	50	50			
Chrysene	218-01-9	100.2	17.368	ug/kg	40-140	50	40-140	50	50			
Acenaphthylene	208-96-8	133.6	25.7848	ug/kg	40-140	50	40-140	50	50			
Anthracene	120-12-7	100.2	32.565	ug/kg	40-140	50	40-140	50	50			
Benzo(ghi)perylene	191-24-2	133.6	19.6392	ug/kg	40-140	50	40-140	50	50			
Fluorene	86-73-7	167	16.2324	ug/kg	40-140	50	40-140	50	50			
Phenanthrene	85-01-8	100.2	20.3072	ug/kg	40-140	50	40-140	50	50			
Dibenzo(a,h)anthracene	53-70-3	100.2	19.3052	ug/kg	40-140	50	40-140	50	50			
Indeno(1,2,3-cd)Pyrene	193-39-5	133.6	23.2798	ug/kg	40-140	50	40-140	50	50			

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NYTCL Semivolatiles - EPA 8270E (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - Glass 250ml/8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Pyrene	129-00-0	100.2	16.5998	ug/kg	35-142	50	35-142	50	50			
Biphenyl	92-52-4	380.76	21.71	ug/kg	37-127	50	37-127	50	50			
4-Chloroaniline	106-47-8	167	30.394	ug/kg	40-140	50	40-140	50	50			
2-Nitroaniline	88-74-4	167	32.1976	ug/kg	47-134	50	47-134	50	50			
3-Nitroaniline	99-09-2	167	31.4962	ug/kg	26-129	50	26-129	50	50			
4-Nitroaniline	100-01-6	167	69.138	ug/kg	41-125	50	41-125	50	50			
Dibenzofuran	132-64-9	167	15.7982	ug/kg	40-140	50	40-140	50	50			
2-Methylnaphthalene	91-57-6	200.4	20.1736	ug/kg	40-140	50	40-140	50	50			
Acetophenone	98-86-2	167	20.6746	ug/kg	14-144	50	14-144	50	50			
2,4,6-Trichlorophenol	88-06-2	100.2	31.6632	ug/kg	30-130	50	30-130	50	50			
P-Chloro-M-Cresol	59-50-7	167	24.883	ug/kg	26-103	50	26-103	50	50			
2-Chlorophenol	95-57-8	167	19.7394	ug/kg	25-102	50	25-102	50	50			
2,4-Dichlorophenol	120-83-2	150.3	26.8536	ug/kg	30-130	50	30-130	50	50			
2,4-Dimethylphenol	105-67-9	167	55.11	ug/kg	30-130	50	30-130	50	50			
2-Nitrophenol	88-75-5	360.72	62.792	ug/kg	30-130	50	30-130	50	50			
4-Nitrophenol	100-02-7	233.8	68.136	ug/kg	11-114	50	11-114	50	50			
2,4-Dinitrophenol	51-28-5	801.6	77.822	ug/kg	4-130	50	4-130	50	50			
4,6-Dinitro-o-cresol	534-52-1	434.2	80.16	ug/kg	10-130	50	10-130	50	50			
Pentachlorophenol	87-86-5	133.6	36.74	ug/kg	17-109	50	17-109	50	50			
Phenol	108-95-2	167	25.217	ug/kg	26-90	50	26-90	50	50			
2-Methylphenol	95-48-7	167	25.885	ug/kg	30-130.	50	30-130.	50	50			
3-Methylphenol/4-Methylphenol	106-44-5	240.48	26.1522	ug/kg	30-130	50	30-130	50	50			
2,4,5-Trichlorophenol	95-95-4	167	31.9972	ug/kg	30-130	50	30-130	50	50			
Benzoic Acid	65-85-0	541.08	169.004	ug/kg	10-110	50	10-110	50	50			
Benzyl Alcohol	100-51-6	167	51.102	ug/kg	40-140	50	40-140	50	50			
Carbazole	86-74-8	167	16.2324	ug/kg	54-128	50	54-128	50	50			
1,4-Dioxane	123-91-1	25.05	7.682	ug/kg	40-140	50	40-140	50	50			
2-Fluorophenol	*367-12-4*									*25-120*		
Phenol-d6	*13127-88-3*									*10-120*		
Nitrobenzene-d5	*4165-60-0*									*23-120*		
2-Fluorobiphenyl	*321-60-8*									*30-120*		
2,4,6-Tribromophenol	*118-79-6*									*10-136*		
4-Terphenyl-d14	*1718-51-0*									*18-120*		

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TCL Pesticides - EPA 8081B (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - Glass 250ml/8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Delta-BHC	319-86-8	1.6008	0.31349	ug/kg	30-150	30	30-150	50	50			
Lindane	58-89-9	0.667	0.298149	ug/kg	30-150	30	30-150	50	50			
Alpha-BHC	319-84-6	0.667	0.189428	ug/kg	30-150	30	30-150	50	50			
Beta-BHC	319-85-7	1.6008	0.60697	ug/kg	30-150	30	30-150	50	50			
Heptachlor	76-44-8	0.8004	0.358846	ug/kg	30-150	30	30-150	50	50			
Aldrin	309-00-2	1.6008	0.563615	ug/kg	30-150	30	30-150	50	50			
Heptachlor epoxide	1024-57-3	3.0015	0.90045	ug/kg	30-150	30	30-150	50	50			
Endrin	72-20-8	0.667	0.27347	ug/kg	30-150	30	30-150	50	50			
Endrin aldehyde	7421-93-4	2.001	0.70035	ug/kg	30-150	30	30-150	50	50			
Endrin ketone	53494-70-5	1.6008	0.412206	ug/kg	30-150	30	30-150	50	50			
Dieldrin	60-57-1	1.0005	0.50025	ug/kg	30-150	30	30-150	50	50			
4,4'-DDE	72-55-9	1.6008	0.370185	ug/kg	30-150	30	30-150	50	50			
4,4'-DDD	72-54-8	1.6008	0.570952	ug/kg	30-150	30	30-150	50	50			
4,4'-DDT	50-29-3	1.6008	1.28731	ug/kg	30-150	30	30-150	50	50			
Endosulfan I	959-98-8	1.6008	0.378189	ug/kg	30-150	30	30-150	50	50			
Endosulfan II	33213-65-9	1.6008	0.534934	ug/kg	30-150	30	30-150	50	50			
Endosulfan sulfate	1031-07-8	0.667	0.317492	ug/kg	30-150	30	30-150	50	50			
Methoxychlor	72-43-5	3.0015	0.9338	ug/kg	30-150	30	30-150	50	50			
Toxaphene	8001-35-2	30.015	8.4042	ug/kg	30-150	30	30-150	50	50			
cis-Chlordane	5103-71-9	2.001	0.557612	ug/kg	30-150	30	30-150	50	50			
trans-Chlordane	5103-74-2	2.001	0.528264	ug/kg	30-150	30	30-150	50	50			
Chlordane	57-74-9	13.34	5.30265	ug/kg	30-150	30	30-150	50	50			
2,4,5,6-Tetrachloro-m-xylene	*877-09-8*									*30-150*		
Decachlorobiphenyl	*2051-24-3*									*30-150*		

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Langan Engineering & Environmental

Herbicides -EPA 8151A (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - Glass 250ml/8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
2,4-D	94-75-7	0.1665	0.0104895	mg/kg	30-150	30	30-150	30	30			
2,4,5-T	93-76-5	0.1665	0.0051615	mg/kg	30-150	30	30-150	30	30			
2,4,5-TP (Silvex)	93-72-1	0.1665	0.0044289	mg/kg	30-150	30	30-150	30	30			
DCAA	*19719-28-9*									*30-150*		

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Langan Engineering & Environmental

TCL PCBs - EPA 8082A (SOIL)

Holding Time: 365 days
Container/Sample Preservation: 1 - Glass 250ml/8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Aroclor 1016	12674-11-2	50	4.44	ug/kg	40-140	50	40-140	50	50			
Aroclor 1221	11104-28-2	50	5.01	ug/kg	40-140	50	40-140	50	50			
Aroclor 1232	11141-16-5	50	10.6	ug/kg	40-140	50	40-140	50	50			
Aroclor 1242	53469-21-9	50	6.74	ug/kg	40-140	50	40-140	50	50			
Aroclor 1248	12672-29-6	50	7.5	ug/kg	40-140	50	40-140	50	50			
Aroclor 1254	11097-69-1	50	5.47	ug/kg	40-140	50	40-140	50	50			
Aroclor 1260	11096-82-5	50	9.24	ug/kg	40-140	50	40-140	50	50			
Aroclor 1262	37324-23-5	50	6.35	ug/kg	40-140	50	40-140	50	50			
Aroclor 1268	11100-14-4	50	5.18	ug/kg	40-140	50	40-140	50	50			
PCBs, Total	1336-36-3	50	4.44	ug/kg				50	50			
2,4,5,6-Tetrachloro-m-xylene	*877-09-8*									*30-150*		
Decachlorobiphenyl	*2051-24-3*									*30-150*		

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METALS by 6010D (SOIL)

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria	Holding Time	Container
Aluminum, Total	7429-90-5	4	1.08	mg/kg	48-151		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Antimony, Total	7440-36-0	2	0.152	mg/kg	1-208		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Arsenic, Total	7440-38-2	0.4	0.0832	mg/kg	79-121		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Barium, Total	7440-39-3	0.4	0.0696	mg/kg	83-117		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Beryllium, Total	7440-41-7	0.2	0.0132	mg/kg	83-117		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Cadmium, Total	7440-43-9	0.4	0.0392	mg/kg	83-117		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Calcium, Total	7440-70-2	4	1.4	mg/kg	81-119		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Chromium, Total	7440-47-3	0.4	0.0384	mg/kg	80-120		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Cobalt, Total	7440-48-4	0.8	0.0664	mg/kg	84-115		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Copper, Total	7440-50-8	0.4	0.1032	mg/kg	81-118		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Iron, Total	7439-89-6	2	0.3612	mg/kg	45-155		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Lead, Total	7439-92-1	2	0.1072	mg/kg	81-117		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Magnesium, Total	7439-95-4	4	0.616	mg/kg	76-124		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Manganese, Total	7439-96-5	0.4	0.0636	mg/kg	81-117		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Nickel, Total	7440-02-0	1	0.0968	mg/kg	83-117		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Potassium, Total	7440-09-7	100	5.76	mg/kg	71-129		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Selenium, Total	7782-49-2	0.8	0.1032	mg/kg	78-122		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Silver, Total	7440-22-4	0.2	0.1132	mg/kg	75-124		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Sodium, Total	7440-23-5	80	1.26	mg/kg	72-127		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Thallium, Total	7440-28-0	0.8	0.126	mg/kg	80-120		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Vanadium, Total	7440-62-2	0.4	0.0812	mg/kg	78-122		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Zinc, Total	7440-66-6	2	0.1172	mg/kg	82-118		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved

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METALS by 7471B (SOIL)

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria	Holding Time	Container
Mercury, Total	7439-97-6	0.08	0.05216	mg/kg	72-128		80-120	20	20		28 days	Metals Only-Glass 60mL/2oz unpreserved

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Langan Engineering & Environmental

WETCHEM (SOIL)

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Method	Holding Time	Container
Chromium, Hexavalent	18540-29-9	0.8	0.16	mg/kg	80-120	20	75-125	20	20	7196A	30 days	1 - Glass 120ml/4oz unpreserved
Cyanide, Total	57-12-5	1	0.212	mg/kg	80-120	35	75-125	35	35	9010C/9012B	14 days	1 - Glass 250ml/8oz unpreserved

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Langan Engineering & Environmental

PFAAs via EPA 1633 (Draft) (SOIL)

Holding Time: 90 days
Container/Sample Preservation: 1 - Plastic 8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Perfluorobutanoic Acid (PFBA)	375-22-4	0.8	0.0504	ng/g	40-150	30	40-150	30	30			
Perfluoropentanoic Acid (PFPeA)	2706-90-3	0.4	0.056	ng/g	40-150	30	40-150	30	30			
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	0.2	0.0432	ng/g	40-150	30	40-150	30	30			
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	757124-72-4	0.8	0.0808	ng/g	40-150	30	40-150	30	30			
Perfluorohexanoic Acid (PFHxA)	307-24-4	0.2	0.0464	ng/g	40-150	30	40-150	30	30			
Perfluoropentanesulfonic Acid (PFPeS)	2706-91-4	0.2	0.0232	ng/g	40-150	30	40-150	30	30			
Perfluoroheptanoic Acid (PFHpA)	375-85-9	0.2	0.0232	ng/g	40-150	30	40-150	30	30			
Perfluorohexanesulfonic Acid (PFHxS)	355-46-4	0.2	0.0592	ng/g	40-150	30	40-150	30	30			
Perfluorooctanoic Acid (PFOA)	335-67-1	0.2	0.052	ng/g	40-150	30	40-150	30	30			
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	27619-97-2	0.8	0.28	ng/g	40-150	30	40-150	30	30			
Perfluoroheptanesulfonic Acid (PFHpS)	375-92-8	0.2	0.0368	ng/g	40-150	30	40-150	30	30			
Perfluorononanoic Acid (PFNA)	375-95-1	0.2	0.0784	ng/g	40-150	30	40-150	30	30			
Perfluorooctanesulfonic Acid (PFOS)	1763-23-1	0.2	0.0792	ng/g	40-150	30	40-150	30	30			
Perfluorodecanoic Acid (PFDA)	335-76-2	0.2	0.0752	ng/g	40-150	30	40-150	30	30			
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	39108-34-4	0.8	0.3872	ng/g	40-150	30	40-150	30	30			
Perfluorononanesulfonic Acid (PFNS)	68259-12-1	0.2	0.0424	ng/g	40-150	30	40-150	30	30			
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA	2355-31-9	0.2	0.1	ng/g	40-150	30	40-150	30	30			
Perfluoroundecanoic Acid (PFUnA)	2058-94-8	0.2	0.0512	ng/g	40-150	30	40-150	30	30			
Perfluorodecanesulfonic Acid (PFDS)	335-77-3	0.2	0.032	ng/g	40-150	30	40-150	30	30			
Perfluorooctanesulfonamide (FOSA)	754-91-6	0.2	0.0432	ng/g	40-150	30	40-150	30	30			
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	2991-50-6	0.2	0.0824	ng/g	40-150	30	40-150	30	30			
Perfluorododecanoic Acid (PFDoA)	307-55-1	0.2	0.0408	ng/g	40-150	30	40-150	30	30			
Perfluorotridecanoic Acid (PFTrDA)	72629-94-8	0.2	0.0528	ng/g	40-150	30	40-150	30	30			
Perfluorotetradecanoic Acid (PFTA)	376-06-7	0.2	0.1064	ng/g	40-150	30	40-150	30	30			
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Pro	13252-13-6	0.8	0.0984	ng/g	40-150	30	40-150	30	30			
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	919005-14-4	0.8	0.1464	ng/g	40-150	30	40-150	30	30			
Perfluorododecane Sulfonic Acid (PFDoDS)	79780-39-5	0.2	0.0384	ng/g	40-150	30	40-150	30	30			
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3	756426-58-1	0.8	0.196	ng/g	40-150	30	40-150	30	30			
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-	763051-92-9	0.8	0.1672	ng/g	40-150	30	40-150	30	30			
N-Methyl Perfluorooctane Sulfonamide (NMeFOSA)	31506-32-8	0.2	0.1	ng/g	40-150	30	40-150	30	30			
N-Ethyl Perfluorooctane Sulfonamide (NEtFOSA)	4151-50-2	0.2	0.112	ng/g	40-150	30	40-150	30	30			
N-Methyl Perfluorooctanesulfonamido Ethanol (NMeFOSE)	24448-09-7	2	0.2504	ng/g	40-150	30	40-150	30	30			
N-Ethyl Perfluorooctanesulfonamido Ethanol (NEtFOSE)	1691-99-2	2	0.5104	ng/g	40-150	30	40-150	30	30			
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	377-73-1	0.4	0.0408	ng/g	40-150	30	40-150	30	30			
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	863090-89-5	0.4	0.0312	ng/g	40-150	30	40-150	30	30			
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEESA)	113507-82-7	0.4	0.0832	ng/g	40-150	30	40-150	30	30			
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	151772-58-6	0.4	0.0952	ng/g	40-150	30	40-150	30	30			
3-Perfluoropropyl Propanoic Acid (3:3FTCA)	356-02-5	1	0.144	ng/g	40-150	30	40-150	30	30			
2H,2H,3H,3H-Perfluorooctanoic Acid (5:3FTCA)	914637-49-3	5	0.5048	ng/g	40-150	30	40-150	30	30			
3-Perfluoroheptyl Propanoic Acid (7:3FTCA)	812-70-4	5	1.76	ng/g	40-150	30	40-150	30	30			
Perfluoro[13C4]Butanoic Acid (MPFBA)	*NONE*									*20-150*		
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	*NONE*									*20-150*		

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PFAAs via EPA 1633 (Draft) (SOIL)

Holding Time: 90 days
Container/Sample Preservation: 1 - Plastic 8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	*NONE*									*20-150*		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4	*NONE*									*20-150*		
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	*NONE*									*20-150*		
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	*NONE*									*20-150*		
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	*NONE*									*20-150*		
Perfluoro[13C8]Octanoic Acid (M8PFOA)	*NONE*									*20-150*		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6	*NONE*									*20-150*		
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	*NONE*									*20-150*		
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	*NONE*									*20-150*		
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	*NONE*									*20-150*		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8	*NONE*									*20-150*		
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (	*NONE*									*20-150*		
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	*NONE*									*20-150*		
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	*NONE*									*20-150*		
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d	*NONE*									*20-150*		
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	*NONE*									*20-150*		
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	*NONE*									*20-150*		
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13	*NONE*									*20-150*		
N-Methyl-d3-Perfluoro-1-Octanesulfonamide (d3-NMeFOSA)	*NONE*									*20-150*		
N-Ethyl-d5-Perfluoro-1-Octanesulfonamide (d5-NEtFOSA)	*NONE*									*20-150*		
2-(N-Methyl-d3-Perfluoro-1-Octanesulfonamido)ethan-d4-ol	*1265205-95-5*									*20-150*		
2-(N-Ethyl-d5-Perfluoro-1-Octanesulfonamido)ethan-d4-ol (d	*NONE*									*20-150*		

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TPH by GC-FID Quantitation Only (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - Glass 250ml/8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
TPH (C10-C36)	NONE	33350	3835.25	ug/kg	40-140	40	40-140	40	40			
o-Terphenyl	*84-15-1*									*40-140*		

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Langan Engineering & Environmental

TPH - Gasoline Range Organics (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - Vial MeOH preserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Gasoline Range Organics	NONE	2500	1450	ug/kg	80-120	20	80-120	20	20			
1,1,1-Trifluorotoluene	*98-08-8*									*70-130*		
4-Bromofluorobenzene	*460-00-4*									*70-130*		

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ATTACHMENT B

GROUNDWATER SAMPLES
LABORATORY REPORTING LIMITS AND METHOD DETECTION LIMITS

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Langan Engineering & Environmental

TCL Volatiles - EPA 8260D (WATER)

Holding Time: 14 days
Container/Sample Preservation: 3 - Vial HCl preserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Methylene chloride	75-09-2	5	0.5393	ug/l	70-130	20	70-130	20	20			
1,1-Dichloroethane	75-34-3	0.75	0.2156	ug/l	70-130	20	70-130	20	20			
Chloroform	67-66-3	0.75	0.1978	ug/l	70-130	20	70-130	20	20			
Carbon tetrachloride	56-23-5	0.5	0.1652	ug/l	63-132	20	63-132	20	20			
1,2-Dichloropropane	78-87-5	1.75	0.2958	ug/l	70-130	20	70-130	20	20			
Dibromochloromethane	124-48-1	0.5	0.1895	ug/l	63-130	20	63-130	20	20			
1,1,2-Trichloroethane	79-00-5	0.75	0.2615	ug/l	70-130	20	70-130	20	20			
Tetrachloroethene	127-18-4	0.5	0.1813	ug/l	70-130	20	70-130	20	20			
Chlorobenzene	108-90-7	0.5	0.1925	ug/l	75-130	20	75-130	20	20			
Trichlorofluoromethane	75-69-4	2.5	0.2667	ug/l	62-150	20	62-150	20	20			
1,2-Dichloroethane	107-06-2	0.5	0.1595	ug/l	70-130	20	70-130	20	20			
1,1,1-Trichloroethane	71-55-6	0.5	0.158	ug/l	67-130	20	67-130	20	20			
Bromodichloromethane	75-27-4	0.5	0.1924	ug/l	67-130	20	67-130	20	20			
trans-1,3-Dichloropropene	10061-02-6	0.5	0.1643	ug/l	70-130	20	70-130	20	20			
cis-1,3-Dichloropropene	10061-01-5	0.5	0.1436	ug/l	70-130	20	70-130	20	20			
1,1-Dichloropropene	563-58-6	2.5	0.2559	ug/l	70-130	20	70-130	20	20			
Bromoform	75-25-2	2	0.2477	ug/l	54-136	20	54-136	20	20			
1,1,2,2-Tetrachloroethane	79-34-5	0.5	0.1915	ug/l	67-130	20	67-130	20	20			
Benzene	71-43-2	0.5	0.194	ug/l	70-130	20	70-130	20	20			
Toluene	108-88-3	0.75	0.2269	ug/l	70-130	20	70-130	20	20			
Ethylbenzene	100-41-4	0.5	0.265	ug/l	70-130	20	70-130	20	20			
Chloromethane	74-87-3	2.5	0.2815	ug/l	64-130	20	64-130	20	20			
Bromomethane	74-83-9	1	0.2563	ug/l	39-139	20	39-139	20	20			
Vinyl chloride	75-01-4	1	0.2241	ug/l	55-140	20	55-140	20	20			
Chloroethane	75-00-3	1	0.2335	ug/l	55-138	20	55-138	20	20			
1,1-Dichloroethene	75-35-4	0.5	0.1811	ug/l	61-145	20	61-145	20	20			
trans-1,2-Dichloroethene	156-60-5	0.75	0.2108	ug/l	70-130	20	70-130	20	20			
Trichloroethene	79-01-6	0.5	0.1746	ug/l	70-130	20	70-130	20	20			
1,2-Dichlorobenzene	95-50-1	2.5	0.1836	ug/l	70-130	20	70-130	20	20			
1,3-Dichlorobenzene	541-73-1	2.5	0.1863	ug/l	70-130	20	70-130	20	20			
1,4-Dichlorobenzene	106-46-7	2.5	0.215	ug/l	70-130	20	70-130	20	20			
Methyl tert butyl ether	1634-04-4	1	0.16	ug/l	63-130	20	63-130	20	20			
p/m-Xylene	179601-23-1	1	0.3477	ug/l	70-130	20	70-130	20	20			
o-Xylene	95-47-6	1	0.3297	ug/l	70-130	20	70-130	20	20			
cis-1,2-Dichloroethene	156-59-2	0.5	0.1866	ug/l	70-130	20	70-130	20	20			
Dibromomethane	74-95-3	5	0.3633	ug/l	70-130	20	70-130	20	20			
1,2,3-Trichloropropane	96-18-4	5	0.4275	ug/l	64-130	20	64-130	20	20			
Acrylonitrile	107-13-1	5	0.4297	ug/l	70-130	20	70-130	20	20			
Styrene	100-42-5	1	0.3591	ug/l	70-130	20	70-130	20	20			
Dichlorodifluoromethane	75-71-8	5	0.2999	ug/l	36-147	20	36-147	20	20			
Acetone	67-64-1	5	1.5606	ug/l	58-148	20	58-148	20	20			
Carbon disulfide	75-15-0	5	0.2995	ug/l	51-130	20	51-130	20	20			

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TCL Volatiles - EPA 8260D (WATER)

Holding Time: 14 days
Container/Sample Preservation: 3 - Vial HCl preserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
2-Butanone	78-93-3	5	1.9386	ug/l	63-138	20	63-138	20	20			
Vinyl acetate	108-05-4	5	0.3111	ug/l	70-130	20	70-130	20	20			
4-Methyl-2-pentanone	108-10-1	5	0.4162	ug/l	59-130	20	59-130	20	20			
2-Hexanone	591-78-6	5	0.5783	ug/l	57-130	20	57-130	20	20			
Bromochloromethane	74-97-5	2.5	0.3295	ug/l	70-130	20	70-130	20	20			
2,2-Dichloropropane	594-20-7	2.5	0.3975	ug/l	63-133	20	63-133	20	20			
1,2-Dibromoethane	106-93-4	2	0.1929	ug/l	70-130	20	70-130	20	20			
1,3-Dichloropropane	142-28-9	2.5	0.2122	ug/l	70-130	20	70-130	20	20			
1,1,1,2-Tetrachloroethane	630-20-6	0.5	0.1652	ug/l	64-130	20	64-130	20	20			
Bromobenzene	108-86-1	2.5	0.1837	ug/l	70-130	20	70-130	20	20			
n-Butylbenzene	104-51-8	0.5	0.1961	ug/l	53-136	20	53-136	20	20			
sec-Butylbenzene	135-98-8	0.5	0.1806	ug/l	70-130	20	70-130	20	20			
tert-Butylbenzene	98-06-6	2.5	0.3016	ug/l	70-130	20	70-130	20	20			
o-Chlorotoluene	95-49-8	2.5	0.1823	ug/l	70-130	20	70-130	20	20			
p-Chlorotoluene	106-43-4	2.5	0.1847	ug/l	70-130	20	70-130	20	20			
1,2-Dibromo-3-chloropropane	96-12-8	2.5	0.327	ug/l	41-144	20	41-144	20	20			
Hexachlorobutadiene	87-68-3	0.6	0.2301	ug/l	63-130	20	63-130	20	20			
Isopropylbenzene	98-82-8	0.5	0.187	ug/l	70-130	20	70-130	20	20			
p-Isopropyltoluene	99-87-6	0.5	0.1885	ug/l	70-130	20	70-130	20	20			
Naphthalene	91-20-3	2.5	0.2174	ug/l	70-130	20	70-130	20	20			
n-Propylbenzene	103-65-1	0.5	0.1734	ug/l	69-130	20	69-130	20	20			
1,2,3-Trichlorobenzene	87-61-6	2.5	0.2338	ug/l	70-130	20	70-130	20	20			
1,2,4-Trichlorobenzene	120-82-1	2.5	0.2197	ug/l	70-130	20	70-130	20	20			
1,3,5-Trimethylbenzene	108-67-8	2.5	0.2105	ug/l	64-130	20	64-130	20	20			
1,2,4-Trimethylbenzene	95-63-6	2.5	0.2678	ug/l	70-130	20	70-130	20	20			
1,4-Dioxane	123-91-1	250	75.7059	ug/l	56-162	20	56-162	20	20			
1,4-Diethylbenzene	105-05-5	2	0.1084	ug/l	70-130	20	70-130	20	20			
4-Ethyltoluene	622-96-8	2	0.4162	ug/l	70-130	20	70-130	20	20			
1,2,4,5-Tetramethylbenzene	95-93-2	2	0.0965	ug/l	70-130	20	70-130	20	20			
Ethyl ether	60-29-7	2.5	0.2045	ug/l	59-134	20	59-134	20	20			
trans-1,4-Dichloro-2-butene	110-57-6	2.5	0.1733	ug/l	70-130	20	70-130	20	20			
1,2-Dichloroethane-d4	*17060-07-0*									*70-130*		
Toluene-d8	*2037-26-5*									*70-130*		
4-Bromofluorobenzene	*460-00-4*									*70-130*		
Dibromofluoromethane	*1868-53-7*									*70-130*		

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NYTCL Semivolatiles - EPA 8270E (LVI) (WATER)

Holding Time: 7 days
Container/Sample Preservation: 2 - Amber 250ml unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Acenaphthene	83-32-9	2.002	0.44408	ug/l	37-111	30	37-111	30	30			
1,2,4-Trichlorobenzene	120-82-1	5.0232	0.49868	ug/l	39-98	30	39-98	30	30			
Hexachlorobenzene	118-74-1	2.002	0.46592	ug/l	40-140	30	40-140	30	30			
Bis(2-chloroethyl)ether	111-44-4	2.002	0.50596	ug/l	40-140	30	40-140	30	30			
2-Chloronaphthalene	91-58-7	2.002	0.4368	ug/l	40-140	30	40-140	30	30			
1,2-Dichlorobenzene	95-50-1	2.002	0.455	ug/l	40-140	30	40-140	30	30			
1,3-Dichlorobenzene	541-73-1	2.002	0.40404	ug/l	40-140	30	40-140	30	30			
1,4-Dichlorobenzene	106-46-7	2.002	0.43316	ug/l	36-97	30	36-97	30	30			
3,3'-Dichlorobenzidine	91-94-1	5.0232	1.62344	ug/l	40-140	30	40-140	30	30			
2,4-Dinitrotoluene	121-14-2	5.0232	1.1648	ug/l	48-143	30	48-143	30	30			
2,6-Dinitrotoluene	606-20-2	5.0232	0.93184	ug/l	40-140	30	40-140	30	30			
Fluoranthene	206-44-0	2.002	0.257348	ug/l	40-140	30	40-140	30	30			
4-Chlorophenyl phenyl ether	7005-72-3	2.002	0.48776	ug/l	40-140	30	40-140	30	30			
4-Bromophenyl phenyl ether	101-55-3	2.002	0.37856	ug/l	40-140	30	40-140	30	30			
Bis(2-chloroisopropyl)ether	108-60-1	2.002	0.5278	ug/l	40-140	30	40-140	30	30			
Bis(2-chloroethoxy)methane	111-91-1	5.0232	0.50232	ug/l	40-140	30	40-140	30	30			
Hexachlorobutadiene	87-68-3	2.002	0.65884	ug/l	40-140	30	40-140	30	30			
Hexachlorocyclopentadiene	77-47-4	20.02	0.68796	ug/l	40-140	30	40-140	30	30			
Hexachloroethane	67-72-1	2.002	0.58604	ug/l	40-140	30	40-140	30	30			
Isophorone	78-59-1	5.0232	1.20484	ug/l	40-140	30	40-140	30	30			
Naphthalene	91-20-3	2.002	0.46592	ug/l	40-140	30	40-140	30	30			
Nitrobenzene	98-95-3	2.002	0.77168	ug/l	40-140	30	40-140	30	30			
NitrosoDiPhenylAmine(NDPA)/DPA	86-30-6	2.002	0.4186	ug/l	40-140	30	40-140	30	30			
n-Nitrosodi-n-propylamine	621-64-7	5.0232	0.64428	ug/l	29-132	30	29-132	30	30			
Bis(2-Ethylhexyl)phthalate	117-81-7	3.003	1.53608	ug/l	40-140	30	40-140	30	30			
Butyl benzyl phthalate	85-68-7	5.0232	1.17208	ug/l	40-140	30	40-140	30	30			
Di-n-butylphthalate	84-74-2	5.0232	0.38948	ug/l	40-140	30	40-140	30	30			
Di-n-octylphthalate	117-84-0	5.0232	1.274	ug/l	40-140	30	40-140	30	30			
Diethyl phthalate	84-66-2	5.0232	0.3822	ug/l	40-140	30	40-140	30	30			
Dimethyl phthalate	131-11-3	5.0232	1.82	ug/l	40-140	30	40-140	30	30			
Benzo(a)anthracene	56-55-3	2.002	0.32578	ug/l	40-140	30	40-140	30	30			
Benzo(a)pyrene	50-32-8	2.002	0.40768	ug/l	40-140	30	40-140	30	30			
Benzo(b)fluoranthene	205-99-2	2.002	0.355264	ug/l	40-140	30	40-140	30	30			
Benzo(k)fluoranthene	207-08-9	2.002	0.37492	ug/l	40-140	30	40-140	30	30			
Chrysene	218-01-9	2.002	0.341068	ug/l	40-140	30	40-140	30	30			
Acenaphthylene	208-96-8	2.002	0.46592	ug/l	45-123	30	45-123	30	30			
Anthracene	120-12-7	2.002	0.32942	ug/l	40-140	30	40-140	30	30			
Benzo(ghi)perylene	191-24-2	2.002	0.296296	ug/l	40-140	30	40-140	30	30			
Fluorene	86-73-7	2.002	0.41496	ug/l	40-140	30	40-140	30	30			
Phenanthrene	85-01-8	2.002	0.33124	ug/l	40-140	30	40-140	30	30			
Dibenzo(a,h)anthracene	53-70-3	2.002	0.323232	ug/l	40-140	30	40-140	30	30			
Indeno(1,2,3-cd)Pyrene	193-39-5	2.002	0.39676	ug/l	40-140	30	40-140	30	30			

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Langan Engineering & Environmental

NYTCL Semivolatiles - EPA 8270E (LVI) (WATER)

Holding Time: 7 days
Container/Sample Preservation: 2 - Amber 250ml unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Pyrene	129-00-0	2.002	0.279552	ug/l	26-127	30	26-127	30	30			
Biphenyl	92-52-4	2.002	0.45864	ug/l	40-140	30	40-140	30	30			
4-Chloroaniline	106-47-8	5.0232	1.07016	ug/l	40-140	30	40-140	30	30			
2-Nitroaniline	88-74-4	5.0232	0.49868	ug/l	52-143	30	52-143	30	30			
3-Nitroaniline	99-09-2	5.0232	0.81536	ug/l	25-145	30	25-145	30	30			
4-Nitroaniline	100-01-6	5.0232	0.8008	ug/l	51-143	30	51-143	30	30			
Dibenzofuran	132-64-9	2.002	0.49868	ug/l	40-140	30	40-140	30	30			
2-Methylnaphthalene	91-57-6	2.002	0.455	ug/l	40-140	30	40-140	30	30			
Acetophenone	98-86-2	5.0232	0.5278	ug/l	39-129	30	39-129	30	30			
2,4,6-Trichlorophenol	88-06-2	5.0232	0.61152	ug/l	30-130	30	30-130	30	30			
P-Chloro-M-Cresol	59-50-7	2.002	0.35126	ug/l	23-97	30	23-97	30	30			
2-Chlorophenol	95-57-8	2.002	0.48048	ug/l	27-123	30	27-123	30	30			
2,4-Dichlorophenol	120-83-2	5.0232	0.41132	ug/l	30-130	30	30-130	30	30			
2,4-Dimethylphenol	105-67-9	5.0232	1.77996	ug/l	30-130	30	30-130	30	30			
2-Nitrophenol	88-75-5	10.01	0.84812	ug/l	30-130	30	30-130	30	30			
4-Nitrophenol	100-02-7	10.01	0.6734	ug/l	10-80	30	10-80	30	30			
2,4-Dinitrophenol	51-28-5	20.02	6.6612	ug/l	20-130	30	20-130	30	30			
4,6-Dinitro-o-cresol	534-52-1	10.01	1.81636	ug/l	20-164	30	20-164	30	30			
Pentachlorophenol	87-86-5	10.01	1.79452	ug/l	9-103	30	9-103	30	30			
Phenol	108-95-2	5.0232	0.56784	ug/l	12-110	30	12-110	30	30			
2-Methylphenol	95-48-7	5.0232	0.4914	ug/l	30-130	30	30-130	30	30			
3-Methylphenol/4-Methylphenol	106-44-5	5.0232	0.48048	ug/l	30-130	30	30-130	30	30			
2,4,5-Trichlorophenol	95-95-4	5.0232	0.77532	ug/l	30-130	30	30-130	30	30			
Benzoic Acid	65-85-0	50.232	2.66084	ug/l	10-164	30	10-164	30	30			
Benzyl Alcohol	100-51-6	2.002	0.58968	ug/l	26-116	30	26-116	30	30			
Carbazole	86-74-8	2.002	0.4914	ug/l	55-144	30	55-144	30	30			
2-Fluorophenol	*367-12-4*									*21-120*		
Phenol-d6	*13127-88-3*									*10-120*		
Nitrobenzene-d5	*4165-60-0*									*23-120*		
2-Fluorobiphenyl	*321-60-8*									*15-120*		
2,4,6-Tribromophenol	*118-79-6*									*10-120*		
4-Terphenyl-d14	*1718-51-0*									*41-149*		

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NYTCL Semivolatiles -EPA 8270E-SIM (LVI) (WATER)

Holding Time: 7 days
Container/Sample Preservation: 2 - Amber 250ml unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Acenaphthene	83-32-9	0.1001	0.01442168	ug/l	40-140	40	40-140	40	40			
2-Chloronaphthalene	91-58-7	0.2002	0.01804712	ug/l	40-140	40	40-140	40	40			
Fluoranthene	206-44-0	0.1001	0.02054052	ug/l	40-140	40	40-140	40	40			
Hexachlorobutadiene	87-68-3	0.5005	0.04674852	ug/l	40-140	40	40-140	40	40			
Naphthalene	91-20-3	0.1001	0.04882696	ug/l	40-140	40	40-140	40	40			
Benzo(a)anthracene	56-55-3	0.1001	0.0198198	ug/l	40-140	40	40-140	40	40			
Benzo(a)pyrene	50-32-8	0.1001	0.01493856	ug/l	40-140	40	40-140	40	40			
Benzo(b)fluoranthene	205-99-2	0.1001	0.01156792	ug/l	40-140	40	40-140	40	40			
Benzo(k)fluoranthene	207-08-9	0.1001	0.00889616	ug/l	40-140	40	40-140	40	40			
Chrysene	218-01-9	0.1001	0.01198288	ug/l	40-140	40	40-140	40	40			
Acenaphthylene	208-96-8	0.1001	0.01222676	ug/l	40-140	40	40-140	40	40			
Anthracene	120-12-7	0.1001	0.01450176	ug/l	40-140	40	40-140	40	40			
Benzo(ghi)perylene	191-24-2	0.1001	0.01365	ug/l	40-140	40	40-140	40	40			
Fluorene	86-73-7	0.1001	0.01456364	ug/l	40-140	40	40-140	40	40			
Phenanthrene	85-01-8	0.1001	0.02333604	ug/l	40-140	40	40-140	40	40			
Dibenzo(a,h)anthracene	53-70-3	0.1001	0.0127218	ug/l	40-140	40	40-140	40	40			
Indeno(1,2,3-cd)Pyrene	193-39-5	0.1001	0.01217216	ug/l	40-140	40	40-140	40	40			
Pyrene	129-00-0	0.1001	0.01902264	ug/l	40-140	40	40-140	40	40			
2-Methylnaphthalene	91-57-6	0.1001	0.02192372	ug/l	40-140	40	40-140	40	40			
Pentachlorophenol	87-86-5	0.8008	0.0143416	ug/l	40-140	40	40-140	40	40			
Hexachlorobenzene	118-74-1	0.8008	0.00938028	ug/l	40-140	40	40-140	40	40			
Hexachloroethane	67-72-1	0.8008	0.06320132	ug/l	40-140	40	40-140	40	40			
2-Fluorophenol	*367-12-4*									*21-120*		
Phenol-d6	*13127-88-3*									*10-120*		
Nitrobenzene-d5	*4165-60-0*									*23-120*		
2-Fluorobiphenyl	*321-60-8*									*15-120*		
2,4,6-Tribromophenol	*118-79-6*									*10-120*		
4-Terphenyl-d14	*1718-51-0*									*41-149*		

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TCL Pesticides - EPA 8081B (WATER)

Holding Time: 7 days
Container/Sample Preservation: 2 - Amber 120ml unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Delta-BHC	319-86-8	0.02	0.00467	ug/l	30-150	20	30-150	30	30			
Lindane	58-89-9	0.02	0.00434	ug/l	30-150	20	30-150	30	30			
Alpha-BHC	319-84-6	0.02	0.00439	ug/l	30-150	20	30-150	30	30			
Beta-BHC	319-85-7	0.02	0.0056	ug/l	30-150	20	30-150	30	30			
Heptachlor	76-44-8	0.02	0.0031	ug/l	30-150	20	30-150	30	30			
Aldrin	309-00-2	0.02	0.00216	ug/l	30-150	20	30-150	30	30			
Heptachlor epoxide	1024-57-3	0.02	0.00415	ug/l	30-150	20	30-150	30	30			
Endrin	72-20-8	0.04	0.00429	ug/l	30-150	20	30-150	30	30			
Endrin aldehyde	7421-93-4	0.04	0.0081	ug/l	30-150	20	30-150	30	30			
Endrin ketone	53494-70-5	0.04	0.00477	ug/l	30-150	20	30-150	30	30			
Dieldrin	60-57-1	0.04	0.00429	ug/l	30-150	20	30-150	30	30			
4,4'-DDE	72-55-9	0.04	0.00381	ug/l	30-150	20	30-150	30	30			
4,4'-DDD	72-54-8	0.04	0.00464	ug/l	30-150	20	30-150	30	30			
4,4'-DDT	50-29-3	0.04	0.00432	ug/l	30-150	20	30-150	30	30			
Endosulfan I	959-98-8	0.02	0.00345	ug/l	30-150	20	30-150	30	30			
Endosulfan II	33213-65-9	0.04	0.00519	ug/l	30-150	20	30-150	30	30			
Endosulfan sulfate	1031-07-8	0.04	0.00481	ug/l	30-150	20	30-150	30	30			
Methoxychlor	72-43-5	0.2	0.00684	ug/l	30-150	20	30-150	30	30			
Toxaphene	8001-35-2	0.2	0.0627	ug/l	30-150	20	30-150	30	30			
cis-Chlordane	5103-71-9	0.02	0.00666	ug/l	30-150	20	30-150	30	30			
trans-Chlordane	5103-74-2	0.02	0.00627	ug/l	30-150	20	30-150	30	30			
Chlordane	57-74-9	0.2	0.0463	ug/l	30-150	20	30-150	30	30			
2,4,5,6-Tetrachloro-m-xylene	*877-09-8*									*30-150*		
Decachlorobiphenyl	*2051-24-3*									*30-150*		

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Langan Engineering & Environmental

Herbicides -EPA 8151A (WATER)

Holding Time: 7 days
Container/Sample Preservation: 2 - Amber 1000ml unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
2,4-D	94-75-7	10	0.498	ug/l	30-150	25	30-150	25	25			
2,4,5-T	93-76-5	2	0.531	ug/l	30-150	25	30-150	25	25			
2,4,5-TP (Silvex)	93-72-1	2	0.539	ug/l	30-150	25	30-150	25	25			
DCAA	*19719-28-9*									*30-150*		

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Langan Engineering & Environmental

TCL PCBs - EPA 8082A (LVI) (WATER)

Holding Time: 365 days
Container/Sample Preservation: 2 - Amber 120ml unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Aroclor 1016	12674-11-2	0.0000714	0.000061047	mg/l	40-140	50	40-140	50	50			
Aroclor 1221	11104-28-2	0.0000714	0.000061047	mg/l	40-140	50	40-140	50	50			
Aroclor 1232	11141-16-5	0.0000714	0.000061047	mg/l	40-140	50	40-140	50	50			
Aroclor 1242	53469-21-9	0.0000714	0.000061047	mg/l	40-140	50	40-140	50	50			
Aroclor 1248	12672-29-6	0.0000714	0.000061047	mg/l	40-140	50	40-140	50	50			
Aroclor 1254	11097-69-1	0.0000714	0.000061047	mg/l	40-140	50	40-140	50	50			
Aroclor 1260	11096-82-5	0.0000714	0.000061047	mg/l	40-140	50	40-140	50	50			
Aroclor 1262	37324-23-5	0.0000714	0.000061047	mg/l	40-140	50	40-140	50	50			
Aroclor 1268	11100-14-4	0.0000714	0.000061047	mg/l	40-140	50	40-140	50	50			
PCBs, Total	1336-36-3	0.0000714	0.000061047	mg/l				50	50			
2,4,5,6-Tetrachloro-m-xylene	*877-09-8*									*30-150*		
Decachlorobiphenyl	*2051-24-3*									*30-150*		

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Langan Engineering & Environmental

METALS by 6020B (WATER)

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria	Holding Time	Container
Aluminum, Total	7429-90-5	0.01	0.00327	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Antimony, Total	7440-36-0	0.004	0.000429	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Arsenic, Total	7440-38-2	0.0005	0.000165	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Barium, Total	7440-39-3	0.0005	0.000173	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Beryllium, Total	7440-41-7	0.0005	0.000107	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Cadmium, Total	7440-43-9	0.0002	0.0000599	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Calcium, Total	7440-70-2	0.1	0.0394	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Chromium, Total	7440-47-3	0.001	0.000178	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Cobalt, Total	7440-48-4	0.0005	0.000163	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Copper, Total	7440-50-8	0.001	0.000384	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Iron, Total	7439-89-6	0.05	0.0191	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Lead, Total	7439-92-1	0.001	0.000343	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Magnesium, Total	7439-95-4	0.07	0.0242	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Manganese, Total	7439-96-5	0.001	0.00044	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Nickel, Total	7440-02-0	0.002	0.000556	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Potassium, Total	7440-09-7	0.1	0.0309	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Selenium, Total	7782-49-2	0.005	0.00173	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Silver, Total	7440-22-4	0.0004	0.000163	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Sodium, Total	7440-23-5	0.1	0.0293	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Thallium, Total	7440-28-0	0.001	0.000143	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Vanadium, Total	7440-62-2	0.005	0.00157	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Zinc, Total	7440-66-6	0.01	0.00341	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved

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METALS by 7470A (WATER)

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria	Holding Time	Container
Mercury, Total	7439-97-6	0.0002	0.0000915	mg/l	80-120		75-125	20	20		28 days	1 - Plastic 500ml HNO3 preserved

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Langan Engineering & Environmental

WETCHEM (WATER)

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Method	Holding Time	Container
Chromium, Hexavalent	18540-29-9	0.01	0.003	mg/l	85-115	20	85-115	20	20	7196A	24 hours	1 - Plastic 500ml unpreserved
Cyanide, Total	57-12-5	0.005	0.0018	mg/l	85-115	20	80-120	20	20	9010C/9012B	14 days	1 - Plastic 250ml NaOH preserved

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1,4 Dioxane via EPA 8270E-SIM (WATER)

Holding Time: 7 days
Container/Sample Preservation: 2 - Amber 250ml unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
1,4-Dioxane	123-91-1	150	33.9	ng/l	88-134	30	88-134	30	30			
1,4-Dioxane-d8	*17647-74-4*									*24-71*		
1,4-Dioxane-d8 (IS)	17647-74-4			ng/l								

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Langan Engineering & Environmental

PFAAs via EPA 1633 (Draft) (WATER)

Holding Time: 28 days
Container/Sample Preservation: 3 - Plastic 500ml unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Perfluorobutanoic Acid (PFBA)	375-22-4	6.4	1.024	ng/l	40-150	30	40-150	30	30			
Perfluoropentanoic Acid (PFPeA)	2706-90-3	3.2	0.856	ng/l	40-150	30	40-150	30	30			
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	1.6	0.536	ng/l	40-150	30	40-150	30	30			
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	757124-72-4	6.4	1.672	ng/l	40-150	30	40-150	30	30			
Perfluorohexanoic Acid (PFHxA)	307-24-4	1.6	0.472	ng/l	40-150	30	40-150	30	30			
Perfluoropentanesulfonic Acid (PFPeS)	2706-91-4	1.6	0.28	ng/l	40-150	30	40-150	30	30			
Perfluoroheptanoic Acid (PFHpA)	375-85-9	1.6	0.32	ng/l	40-150	30	40-150	30	30			
Perfluorohexanesulfonic Acid (PFHxS)	355-46-4	1.6	0.384	ng/l	40-150	30	40-150	30	30			
Perfluorooctanoic Acid (PFOA)	335-67-1	1.6	0.696	ng/l	40-150	30	40-150	30	30			
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	27619-97-2	6.4	2.16	ng/l	40-150	30	40-150	30	30			
Perfluoroheptanesulfonic Acid (PFHpS)	375-92-8	1.6	0.432	ng/l	40-150	30	40-150	30	30			
Perfluorononanoic Acid (PFNA)	375-95-1	1.6	0.504	ng/l	40-150	30	40-150	30	30			
Perfluorooctanesulfonic Acid (PFOS)	1763-23-1	1.6	0.728	ng/l	40-150	30	40-150	30	30			
Perfluorodecanoic Acid (PFDA)	335-76-2	1.6	0.648	ng/l	40-150	30	40-150	30	30			
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	39108-34-4	6.4	2.488	ng/l	40-150	30	40-150	30	30			
Perfluorononanesulfonic Acid (PFNS)	68259-12-1	1.6	0.496	ng/l	40-150	30	40-150	30	30			
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA	2355-31-9	1.6	0.872	ng/l	40-150	30	40-150	30	30			
Perfluoroundecanoic Acid (PFUnA)	2058-94-8	1.6	0.696	ng/l	40-150	30	40-150	30	30			
Perfluorodecanesulfonic Acid (PFDS)	335-77-3	1.6	0.368	ng/l	40-150	30	40-150	30	30			
Perfluorooctanesulfonamide (FOSA)	754-91-6	1.6	0.432	ng/l	40-150	30	40-150	30	30			
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	2991-50-6	1.6	0.864	ng/l	40-150	30	40-150	30	30			
Perfluorododecanoic Acid (PFDoA)	307-55-1	1.6	0.736	ng/l	40-150	30	40-150	30	30			
Perfluorotridecanoic Acid (PFTrDA)	72629-94-8	1.6	0.6	ng/l	40-150	30	40-150	30	30			
Perfluorotetradecanoic Acid (PFTA)	376-06-7	1.6	0.424	ng/l	40-150	30	40-150	30	30			
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Pro	13252-13-6	6.4	0.896	ng/l	40-150	30	40-150	30	30			
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	919005-14-4	6.4	1.008	ng/l	40-150	30	40-150	30	30			
Perfluorododecane Sulfonic Acid (PFDoDS)	79780-39-5	1.6	0.608	ng/l	40-150	30	40-150	30	30			
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3	756426-58-1	6.4	1.32	ng/l	40-150	30	40-150	30	30			
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-	763051-92-9	6.4	1.32	ng/l	40-150	30	40-150	30	30			
N-Methyl Perfluorooctane Sulfonamide (NMeFOSA)	31506-32-8	1.6	0.696	ng/l	40-150	30	40-150	30	30			
N-Ethyl Perfluorooctane Sulfonamide (NEtFOSA)	4151-50-2	1.6	0.736	ng/l	40-150	30	40-150	30	30			
N-Methyl Perfluorooctanesulfonamido Ethanol (NMeFOSE)	24448-09-7	16	3.76	ng/l	40-150	30	40-150	30	30			
N-Ethyl Perfluorooctanesulfonamido Ethanol (NEtFOSE)	1691-99-2	16	1.96	ng/l	40-150	30	40-150	30	30			
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	377-73-1	3.2	0.456	ng/l	40-150	30	40-150	30	30			
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	863090-89-5	3.2	0.424	ng/l	40-150	30	40-150	30	30			
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEESA)	113507-82-7	3.2	0.352	ng/l	40-150	30	40-150	30	30			
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	151772-58-6	3.2	1.888	ng/l	40-150	30	40-150	30	30			
3-Perfluoropropyl Propanoic Acid (3:3FTCA)	356-02-5	8	2.64	ng/l	40-150	30	40-150	30	30			
2H,2H,3H,3H-Perfluorooctanoic Acid (5:3FTCA)	914637-49-3	40	9.36	ng/l	40-150	30	40-150	30	30			
3-Perfluoroheptyl Propanoic Acid (7:3FTCA)	812-70-4	40	6.312	ng/l	40-150	30	40-150	30	30			
Perfluoro[13C4]Butanoic Acid (MPFBA)	*NONE*									*20-150*		
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	*NONE*									*20-150*		

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PFAAs via EPA 1633 (Draft) (WATER)

Holding Time: 28 days
Container/Sample Preservation: 3 - Plastic 500ml unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	*NONE*									*20-150*		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4	*NONE*									*20-150*		
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	*NONE*									*20-150*		
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	*NONE*									*20-150*		
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	*NONE*									*20-150*		
Perfluoro[13C8]Octanoic Acid (M8PFOA)	*NONE*									*20-150*		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6	*NONE*									*20-150*		
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	*NONE*									*20-150*		
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	*NONE*									*20-150*		
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	*NONE*									*20-150*		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8	*NONE*									*20-150*		
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (	*NONE*									*20-150*		
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	*NONE*									*20-150*		
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	*NONE*									*20-150*		
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d	*NONE*									*20-150*		
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	*NONE*									*20-150*		
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	*NONE*									*20-150*		
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13	*NONE*									*20-150*		
N-Methyl-d3-Perfluoro-1-Octanesulfonamide (d3-NMeFOSA)	*NONE*									*20-150*		
N-Ethyl-d5-Perfluoro-1-Octanesulfonamide (d5-NEtFOSA)	*NONE*									*20-150*		
2-(N-Methyl-d3-Perfluoro-1-Octanesulfonamido)ethan-d4-ol	*1265205-95-5*									*20-150*		
2-(N-Ethyl-d5-Perfluoro-1-Octanesulfonamido)ethan-d4-ol (d	*NONE*									*20-150*		

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TPH by GC-FID Quantitation Only (WATER)

Holding Time: 7 days
Container/Sample Preservation: 2 - Amber 500ml unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
TPH (C10-C36)	NONE	200	84	ug/l	40-140	40	40-140	40	40			
o-Terphenyl	*84-15-1*									*40-140*		

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Langan Engineering & Environmental

TPH - Gasoline Range Organics (WATER)

Holding Time: 14 days
Container/Sample Preservation: 3 - Vial HCl preserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Gasoline Range Organics	NONE	50	5.8	ug/l	80-120	20	80-120	20	20			
1,1,1-Trifluorotoluene	*98-08-8*									*70-130*		
4-Bromofluorobenzene	*460-00-4*									*70-130*		

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Attachment B
Air Samples
Laboratory Reporting Limits and Method Detection Limits

Method	Analyte	Reporting Limit	Units		Method	Analyte	Reporting Limit	Units
TO15	1,1,2,2-Tetrachloroethane	1.37	ug/m3		TO15	1,1,2,2-Tetrachloroethane	0.2	ppbV
TO15	1,1,2-Trichloroethane	1.09	ug/m3		TO15	1,1,2-Trichloroethane	0.2	ppbV
TO15	1,1-Dichloroethane	0.809	ug/m3		TO15	1,1-Dichloroethane	0.2	ppbV
TO15	1,2,4-Trichlorobenzene	1.48	ug/m3		TO15	1,2,4-Trichlorobenzene	0.2	ppbV
TO15	1,2,4-Trimethylbenzene	0.983	ug/m3		TO15	1,2,4-Trimethylbenzene	0.2	ppbV
TO15	1,2-Dibromoethane	1.54	ug/m3		TO15	1,2-Dibromoethane	0.2	ppbV
TO15	1,2-Dichlorobenzene	1.2	ug/m3		TO15	1,2-Dichlorobenzene	0.2	ppbV
TO15	1,2-Dichloroethane	0.809	ug/m3		TO15	1,2-Dichloroethane	0.2	ppbV
TO15	1,2-Dichloropropane	0.924	ug/m3		TO15	1,2-Dichloropropane	0.2	ppbV
TO15	1,3,5-Trimethylbenzene	0.983	ug/m3		TO15	1,3,5-Trimethylbenzene	0.2	ppbV
TO15	1,3-Butadiene	0.442	ug/m3		TO15	1,3-Butadiene	0.2	ppbV
TO15	1,3-Dichlorobenzene	1.2	ug/m3		TO15	1,3-Dichlorobenzene	0.2	ppbV
TO15	1,4-Dichlorobenzene	1.2	ug/m3		TO15	1,4-Dichlorobenzene	0.2	ppbV
TO15	1,4-Dioxane	0.721	ug/m3		TO15	1,4-Dioxane	0.2	ppbV
TO15	2,2,4-Trimethylpentane	0.934	ug/m3		TO15	2,2,4-Trimethylpentane	0.2	ppbV
TO15	2-Butanone	1.47	ug/m3		TO15	2-Butanone	0.5	ppbV
TO15	2-Hexanone	0.82	ug/m3		TO15	2-Hexanone	0.2	ppbV
TO15	3-Chloropropene	0.626	ug/m3		TO15	3-Chloropropene	0.2	ppbV
TO15	4-Ethyltoluene	0.983	ug/m3		TO15	4-Ethyltoluene	0.2	ppbV
TO15	4-Methyl-2-pentanone	2.05	ug/m3		TO15	4-Methyl-2-pentanone	0.5	ppbV
TO15	Acetone	2.38	ug/m3		TO15	Acetone	1	ppbV
TO15	Benzene	0.639	ug/m3		TO15	Benzene	0.2	ppbV
TO15	Benzyl chloride	1.04	ug/m3		TO15	Benzyl chloride	0.2	ppbV
TO15	Bromodichloromethane	1.34	ug/m3		TO15	Bromodichloromethane	0.2	ppbV
TO15	Bromoform	2.07	ug/m3		TO15	Bromoform	0.2	ppbV
TO15	Bromomethane	0.777	ug/m3		TO15	Bromomethane	0.2	ppbV
TO15	Carbon disulfide	0.623	ug/m3		TO15	Carbon disulfide	0.2	ppbV
TO15	Chlorobenzene	0.921	ug/m3		TO15	Chlorobenzene	0.2	ppbV
TO15	Chloroethane	0.528	ug/m3		TO15	Chloroethane	0.2	ppbV
TO15	Chloroform	0.977	ug/m3		TO15	Chloroform	0.2	ppbV
TO15	Chloromethane	0.413	ug/m3		TO15	Chloromethane	0.2	ppbV
TO15	cis-1,3-Dichloropropene	0.908	ug/m3		TO15	cis-1,3-Dichloropropene	0.2	ppbV
TO15	Cyclohexane	0.688	ug/m3		TO15	Cyclohexane	0.2	ppbV
TO15	Dibromochloromethane	1.7	ug/m3		TO15	Dibromochloromethane	0.2	ppbV
TO15	Dichlorodifluoromethane	0.989	ug/m3		TO15	Dichlorodifluoromethane	0.2	ppbV
TO15	Ethanol	9.42	ug/m3		TO15	Ethanol	5	ppbV
TO15	Ethyl Acetate	1.8	ug/m3		TO15	Ethyl Acetate	0.5	ppbV
TO15	Ethylbenzene	0.869	ug/m3		TO15	Ethylbenzene	0.2	ppbV
TO15	Freon-113	1.53	ug/m3		TO15	Freon-113	0.2	ppbV
TO15	Freon-114	1.4	ug/m3		TO15	Freon-114	0.2	ppbV
TO15	Heptane	0.82	ug/m3		TO15	Heptane	0.2	ppbV
TO15	Hexachlorobutadiene	2.13	ug/m3		TO15	Hexachlorobutadiene	0.2	ppbV
TO15	Isopropanol	1.23	ug/m3		TO15	Isopropanol	0.5	ppbV
TO15	Methyl tert butyl ether	0.721	ug/m3		TO15	Methyl tert butyl ether	0.2	ppbV
TO15	Methylene chloride	1.74	ug/m3		TO15	Methylene chloride	0.5	ppbV
TO15	n-Hexane	0.705	ug/m3		TO15	n-Hexane	0.2	ppbV
TO15	o-Xylene	0.869	ug/m3		TO15	o-Xylene	0.2	ppbV
TO15	p/m-Xylene	1.74	ug/m3		TO15	p/m-Xylene	0.4	ppbV
TO15	Styrene	0.852	ug/m3		TO15	Styrene	0.2	ppbV
TO15	Tertiary butyl Alcohol	1.52	ug/m3		TO15	Tertiary butyl Alcohol	0.5	ppbV
TO15	Tetrahydrofuran	1.47	ug/m3		TO15	Tetrahydrofuran	0.5	ppbV
TO15	Toluene	0.754	ug/m3		TO15	Toluene	0.2	ppbV
TO15	trans-1,2-Dichloroethene	0.793	ug/m3		TO15	trans-1,2-Dichloroethene	0.2	ppbV
TO15	trans-1,3-Dichloropropene	0.908	ug/m3		TO15	trans-1,3-Dichloropropene	0.2	ppbV
TO15	Trichlorofluoromethane	1.12	ug/m3		TO15	Trichlorofluoromethane	0.2	ppbV
TO15	Vinyl bromide	0.874	ug/m3		TO15	Vinyl bromide	0.2	ppbV
TO15-SIM	1,1,1-Trichloroethane	0.109	ug/m3		TO15-SIM	1,1,1-Trichloroethane	0.02	ppbV
TO15-SIM	1,1-Dichloroethene	0.079	ug/m3		TO15-SIM	1,1-Dichloroethene	0.02	ppbV
TO15-SIM	Carbon tetrachloride	0.126	ug/m3		TO15-SIM	Carbon tetrachloride	0.02	ppbV
TO15-SIM	cis-1,2-Dichloroethene	0.079	ug/m3		TO15-SIM	cis-1,2-Dichloroethene	0.02	ppbV
TO15-SIM	Tetrachloroethene	0.136	ug/m3		TO15-SIM	Tetrachloroethene	0.02	ppbV
TO15-SIM	Trichloroethene	0.107	ug/m3		TO15-SIM	Trichloroethene	0.02	ppbV
TO15-SIM	Vinyl chloride	0.051	ug/m3		TO15-SIM	Vinyl chloride	0.02	ppbV

Attachment B
Soil Vapor Samples
Laboratory Reporting Limits and Method Detection Limits

Method	Analyte	Reporting Limit	Units	Method	Analyte	Reporting Limit	Units
TO15	1,1,1-Trichloroethane	1.09	ug/m3	TO15	1,1,1-Trichloroethane	0.2	ppbV
TO15	1,1,2,2-Tetrachloroethane	1.37	ug/m3	TO15	1,1,2,2-Tetrachloroethane	0.2	ppbV
TO15	1,1,2-Trichloroethane	1.09	ug/m3	TO15	1,1,2-Trichloroethane	0.2	ppbV
TO15	1,1-Dichloroethane	0.809	ug/m3	TO15	1,1-Dichloroethane	0.2	ppbV
TO15	1,1-Dichloroethene	0.793	ug/m3	TO15	1,1-Dichloroethene	0.2	ppbV
TO15	1,2,4-Trichlorobenzene	1.48	ug/m3	TO15	1,2,4-Trichlorobenzene	0.2	ppbV
TO15	**1,2,4-Trimethylbenzene**	**0.983**	**ug/m3**	**TO15**	**1,2,4-Trimethylbenzene**	**0.2**	**ppbV**
TO15	1,2-Dibromoethane	1.54	ug/m3	TO15	1,2-Dibromoethane	0.2	ppbV
TO15	1,2-Dichlorobenzene	1.2	ug/m3	TO15	1,2-Dichlorobenzene	0.2	ppbV
TO15	1,2-Dichloroethane	0.809	ug/m3	TO15	1,2-Dichloroethane	0.2	ppbV
TO15	1,2-Dichloropropane	0.924	ug/m3	TO15	1,2-Dichloropropane	0.2	ppbV
TO15	**1,3,5-Trimethylbenzene**	**0.983**	**ug/m3**	**TO15**	**1,3,5-Trimethylbenzene**	**0.2**	**ppbV**
TO15	1,3-Butadiene	0.442	ug/m3	TO15	1,3-Butadiene	0.2	ppbV
TO15	1,3-Dichlorobenzene	1.2	ug/m3	TO15	1,3-Dichlorobenzene	0.2	ppbV
TO15	1,4-Dichlorobenzene	1.2	ug/m3	TO15	1,4-Dichlorobenzene	0.2	ppbV
TO15	1,4-Dioxane	0.721	ug/m3	TO15	1,4-Dioxane	0.2	ppbV
TO15	**2,2,4-Trimethylpentane**	**0.934**	**ug/m3**	**TO15**	**2,2,4-Trimethylpentane**	**0.2**	**ppbV**
TO15	2-Butanone	1.47	ug/m3	TO15	2-Butanone	0.5	ppbV
TO15	2-Hexanone	0.82	ug/m3	TO15	2-Hexanone	0.2	ppbV
TO15	3-Chloropropene	0.626	ug/m3	TO15	3-Chloropropene	0.2	ppbV
TO15	4-Ethyltoluene	0.983	ug/m3	TO15	4-Ethyltoluene	0.2	ppbV
TO15	4-Methyl-2-pentanone	2.05	ug/m3	TO15	4-Methyl-2-pentanone	0.5	ppbV
TO15	Acetone	2.38	ug/m3	TO15	Acetone	1	ppbV
TO15	**Benzene**	**0.639**	**ug/m3**	**TO15**	**Benzene**	**0.2**	**ppbV**
TO15	Benzyl chloride	1.04	ug/m3	TO15	Benzyl chloride	0.2	ppbV
TO15	Bromodichloromethane	1.34	ug/m3	TO15	Bromodichloromethane	0.2	ppbV
TO15	Bromoform	2.07	ug/m3	TO15	Bromoform	0.2	ppbV
TO15	Bromomethane	0.777	ug/m3	TO15	Bromomethane	0.2	ppbV
TO15	Carbon disulfide	0.623	ug/m3	TO15	Carbon disulfide	0.2	ppbV
TO15	Carbon tetrachloride	1.26	ug/m3	TO15	Carbon tetrachloride	0.2	ppbV
TO15	Chlorobenzene	0.921	ug/m3	TO15	Chlorobenzene	0.2	ppbV
TO15	Chloroethane	0.528	ug/m3	TO15	Chloroethane	0.2	ppbV
TO15	Chloroform	0.977	ug/m3	TO15	Chloroform	0.2	ppbV
TO15	Chloromethane	0.413	ug/m3	TO15	Chloromethane	0.2	ppbV
TO15	cis-1,2-Dichloroethene	0.793	ug/m3	TO15	cis-1,2-Dichloroethene	0.2	ppbV
TO15	cis-1,3-Dichloropropene	0.908	ug/m3	TO15	cis-1,3-Dichloropropene	0.2	ppbV
TO15	**Cyclohexane**	**0.688**	**ug/m3**	**TO15**	**Cyclohexane**	**0.2**	**ppbV**
TO15	Dibromochloromethane	1.7	ug/m3	TO15	Dibromochloromethane	0.2	ppbV
TO15	Dichlorodifluoromethane	0.989	ug/m3	TO15	Dichlorodifluoromethane	0.2	ppbV
TO15	Ethanol	9.42	ug/m3	TO15	Ethanol	5	ppbV
TO15	Ethyl Acetate	1.8	ug/m3	TO15	Ethyl Acetate	0.5	ppbV
TO15	**Ethylbenzene**	**0.869**	**ug/m3**	**TO15**	**Ethylbenzene**	**0.2**	**ppbV**
TO15	Freon-113	1.53	ug/m3	TO15	Freon-113	0.2	ppbV
TO15	Freon-114	1.4	ug/m3	TO15	Freon-114	0.2	ppbV
TO15	**Heptane**	**0.82**	**ug/m3**	**TO15**	**Heptane**	**0.2**	**ppbV**
TO15	Hexachlorobutadiene	2.13	ug/m3	TO15	Hexachlorobutadiene	0.2	ppbV
TO15	Isopropanol	1.23	ug/m3	TO15	Isopropanol	0.5	ppbV
TO15	Methyl tert butyl ether	0.721	ug/m3	TO15	Methyl tert butyl ether	0.2	ppbV
TO15	Methylene chloride	1.74	ug/m3	TO15	Methylene chloride	0.5	ppbV
TO15	**n-Hexane**	**0.705**	**ug/m3**	**TO15**	**n-Hexane**	**0.2**	**ppbV**
TO15	**o-Xylene**	**0.869**	**ug/m3**	**TO15**	**o-Xylene**	**0.2**	**ppbV**
TO15	**p/m-Xylene**	**1.74**	**ug/m3**	**TO15**	**p/m-Xylene**	**0.4**	**ppbV**
TO15	Styrene	0.852	ug/m3	TO15	Styrene	0.2	ppbV
TO15	Tertiary butyl Alcohol	1.52	ug/m3	TO15	Tertiary butyl Alcohol	0.5	ppbV
TO15	Tetrachloroethene	1.36	ug/m3	TO15	Tetrachloroethene	0.2	ppbV
TO15	Tetrahydrofuran	1.47	ug/m3	TO15	Tetrahydrofuran	0.5	ppbV
TO15	**Toluene**	**0.754**	**ug/m3**	**TO15**	**Toluene**	**0.2**	**ppbV**
TO15	trans-1,2-Dichloroethene	0.793	ug/m3	TO15	trans-1,2-Dichloroethene	0.2	ppbV
TO15	trans-1,3-Dichloropropene	0.908	ug/m3	TO15	trans-1,3-Dichloropropene	0.2	ppbV
TO15	Trichloroethene	1.07	ug/m3	TO15	Trichloroethene	0.2	ppbV
TO15	Trichlorofluoromethane	1.12	ug/m3	TO15	Trichlorofluoromethane	0.2	ppbV
TO15	Vinyl bromide	0.874	ug/m3	TO15	Vinyl bromide	0.2	ppbV
TO15	Vinyl chloride	0.511	ug/m3	TO15	Vinyl chloride	0.2	ppbV
TO15-LL	**Naphthalene**	**1.05**	**ug/m3**	**TO15**	**Naphthalene**	**0.2**	**ppbV**

ATTACHMENT D

ANALYTICAL METHODS/QUALITY ASSURANCE SUMMARY TABLE

ATTACHMENT D

ANALYTICAL METHODS/QUALITY ASSURANCE SUMMARY TABLE

Matrix Type	Field Parameters	Laboratory Parameters	Analytical Methods	Sample Preservation	Sample Container Volume and Type	Sample Hold Time	Field Duplicate Samples	Equipment Blank Samples	Trip Blank Samples	Ambient Air Samples	MS/MSD Samples
Groundwater	Temperature, Turbidity, pH, ORP, Conductivity	Part 375 + TCL VOCs	EPA 8260C	Cool to 4°C; HCl to pH <2;no headspace	Three 40-mL VOC vials with Teflon®-lined cap	Analyze within 14 days of collection	1 per 20 samples (minimum 1)	1 per 20 samples (minimum 1)	1 per shipment of VOC samples	NA	1 per 20 samples
		1,4-dioxane	8270D SIM isotope dilution	Cool to 4°C	One 1-Liter Amber Glass	7 days to extract, 40 days after extraction to analysis					
		Part 375 + TCL SVOCs	EPA 8270D	Cool to 4°C	Two 1-Liter Amber Glass	7 days to extract, 40 days after extraction to analysis					
		Part 375 + TAL Metals	EPA 6020B, EPA 7470A	Cool to 4°C; HNO_3	250 ml plastic	6 months, except Mercury 28 days					
		Hexavalent Chromium	EPA 7196A	Cool to 4°C	250 ml plastic	24 hours					
		Cyanide	EPA 9010C/9012B	Cool to 4°C; NaOH plus 0.6g ascorbic acid	250 ml plastic	14 days					
		Part 375 + TCL Herbicides	EPA 8151A	Cool to 4°C	Two 1-Liter Amber Glass	7 days to extract, 40 days after extraction to analysis					
		Part 375 + TCL Pesticides	EPA 8081B	Cool to 4°C	Two 1-Liter Amber Glass for Pesticides/PCB	7 days to extract, 40 days after extraction to analysis					
		PCBs	EPA 8082A	Cool to 4°C		7 days to extract, 40 days after extraction to analysis					
		Per- and polyfluoroalykl substances (PFAS)	EPA 1633	Cool to 4°C, Trizma	Two 250 mL high density polyethylene (HDPE) bottles	14 days	1 per 20 samples (minimum 1)	1 per 20 samples (minimum 1)	N/A	N/A	1 per 20 samples (minimum 1)

ATTACHMENT D

ANALYTICAL METHODS/QUALITY ASSURANCE SUMMARY TABLE

Matrix Type	Field Parameters	Laboratory Parameters	Analytical Methods	Sample Preservation	Sample Container Volume and Type	Sample Hold Time	Field Duplicate Samples	Equipment Blank Samples	Trip Blank Samples	Ambient Air Samples	MS/MSD Samples
Soil	Total VOCs via PID	Part 375 + TCL VOCs	EPA 8260C	Cool to 4°C	Two 40-ml VOC vials with 5ml H_2O, one with MeOH (separate container for % solids)	48 hours after sampling if samples are not frozen to -7° C, 14 days after extraction to analysis	1 per 20 samples (minimum 1)	1 per 20 samples (minimum 1)	1 per shipment of VOC samples	NA	1 per 20 samples
		Part 375 + TCL SVOCs	EPA 8270D	Cool to 4°C	4 oz. amber glass jar	14 days extract, 40 days after extraction to analysis					
		Part 375 + TAL Metals	EPA 6010D, EPA 7471B, EPA 7196A, EPA 9010C/9012B	Cool to 4°C	2 oz. amber glass jar	6 months, except mercury 28 days					
		Part 375 + TCL Pesticides	EPA 8081B	Cool to 4°C	4 oz. amber glass jar	14 days extract, 40 days after extraction to analysis					
		Part 375 + TCL Herbicides	EPA 8151A	Cool to 4°C	4 oz. amber glass jar	14 days extract, 40 days after extraction to analysis					
		Part 375 + TCL PCBs	EPA 8082A	Cool to 4°C	4 oz. amber glass jar	14 days extract, 40 days after extraction to analysis					
		PFAS	LC/MS/MS method based on Method 1633	Cool to 4°C	8 oz. plastic	14 days extract, 28 days after extraction to analysis	1 per 20 samples or 1 per day (whichever is more frequent)				
Product	N/A	Petrleum Hydrocarbon Identification (PHI)	EPA 8015D(M)	Cool to 4°C	4 oz. amber glass jar	14 days extract, 40 days after extraction to analysis	N/A	N/A	N/A	N/A	N/A
		Density	ASTM D1475	Cool to 4°C	4 oz. amber glass jar	N/A	N/A	N/A	N/A	N/A	N/A
		Viscosity	ASTM D445	Cool to 4°C	4 oz. amber glass jar	N/A	N/A	N/A	N/A	N/A	N/A
Soil Vapor	Total VOCs and Methane with MultiGas Meter	TO-15 Listed VOCs	TO-15	Ambient Temperature	6-Liter Summa Canister	Analyze within 30 days of collection	1 per 20 samples (minimum 1)	NA	NA	1 per 10 samples (minimum 1)	NA
Ambient Air	Total VOCs via PID	TO-15 Listed VOCs	TO-15	Ambient Temperature	6-Liter Summa Canister	Analyze within 30 days of collection	1 per 20 samples (minimum 1)	NA	NA	1 per 10 samples (minimum 1)	NA

Notes:
1. PID - Photoionization Detector
2. VOC - Volatile organic compound
3. EPA - Environmental Protection Agency
4. TCL - Target compound list
5. TAL - Target analyte list

ATTACHMENT E

SAMPLE NOMENCLATURE

SOP #01 – Sample Nomenclature

INTRODUCTION

The Langan Environmental Group conducts an assortment of site investigations where samples (Vapor, Solids, and Aqueous) are collected and submitted to analytical laboratories for analysis. The results of which are then evaluated and entered into a data base allowing quick submittal to the state regulatory authority (New York State Division of Environmental Conservation [NYSDEC]). In addition, Langan is linking their data management system to graphic and analytical software to enable efficient evaluation of the data as well as creating client-ready presentational material.

SCOPE AND APPLICATION

This Standard Operating Procedure (SOP) is applicable to the general framework for labeling vapor, solid (soil) and aqueous (groundwater) samples that will be submitted for laboratory analysis. The nomenclature being introduced is designed to meet the NYSDEC EQuIS standard and has been incorporated into Langan software scripts to assist project personnel in processing the data. While this SOP is applicable to all site investigation; unanticipated conditions may arise which may require considerable flexibility in complying with this SOP. Therefore, guidance provided in this SOP is presented in terms of general steps and strategies that should be applied; but deviation from this SOP must be reported to the Project Manager (PM) immediately.

GENERAL SAMPLE IDENTIFICATION CONSIDERATIONS

Sample Labels

All sample ware must have a label. Recall that when you are using the Encore™ samples (see below); they are delivered in plastic lined foil bags. You are to label the bags[1]:

All other samples containers including Terra Cores™ must be labeled with laboratory provided self-adhesive labels.

Quick Breakdown of Sample Format

The general format for sample nomenclature is:

[1]Both Alpha and York laboratories permit the combining of the three Encore™ into a single bag. This may not be appropriate for all laboratories so please confirm with the labs themselves

LLNN_ID

Where

LL is a grouping of two (2) to four (4) letters signifying the sample media source. In older nomenclature SOPs this portion of the sample identification is commonly referred to as the *Sample Investigation Code*

NN represents a two digit number identifying the specific sample location or sample sequence number

_ ***(underscore)*** is required between the sample lettering and numeric identification and additional modifying data that determines the date of sampling or the depth of the sample interval

ID is a modifier specific to the sample type media (depth of soil sample or date of groundwater sample)

LL – Sample Investigation Code

Langan has devised a list of two to four letters to insure a quick ability to identify the sample investigation.

Code	Investigation
AA	Ambient Air
DS	Drum
EPB	Endpoint Location - Bottom (Excavation)
EPSW	Endpoint Location - Sidewall (Excavation)
FP	Free Product
IA	Indoor Air
IDW	Investigation Derived Waste (Soil Pile)
MW	Monitoring Well (Permanent)
SB	Soil Boring
SG	Staff Gauge (Stream Gauging)
SL	Sludge
SV	Soil Vapor Point
SVE	Soil Vapor Extraction Well
SW	Surface Water
TMW	Temporary Monitoring Well
TP	Test Pit (Excavated Material from Test Pit Not Associated With Sidewall or Bottom Samples)
WC	Waste Characterization Boring
COMP	Composite Sample
TB	Trip Blank (QA/QC Sampling – All Investigations)
FB	Field Blank (QA/QC Sampling – All Investigations)
DUP	Duplicate (QA/QC Sampling – All Investigations)

NN – Numeric Identifier

The two digit number that follows the sample investigation code (LL) identifies the specific sample based on the soil boring, monitoring well, endpoint or other location identification. For a subset of samples

where there is no specific location identifier, the two digit number is the sequence number for the sample submitted. For example, an aqueous sample from a monitoring well identified as MW-1 would have the sample investigation code of MW and the numeric identifier as 01. Note there is no hyphen. The same can be done for soil borings, a soil sample collected from soil boring 9 (SB-9) would be have the LLNN identification of SB09 (again, no hyphen).

Note however that there is a subset of samples related to laboratory analytical quality assurance, among these includes TB, FB, and DUP. On many investigations, the Scope will require multiple collections of these types of samples, therefore the numerical number represents the sequence sample count where the first sample is 01, the second sample is 02, and the third sample is 03 and so on.

_ Underscore
The underscore is required. It separates the investigation code and numeric identifier from the modifier specific to the sample itself. Note that every effort should be made to insure that the underscore is clear on the sample label and chain of custody (COC).

ID – Modifier Specific to Type Media
Each sample investigation code and numeric identifier is further modified by an ID specific to the sample type media. In general, soil samples (soil borings or endpoint samples) use an ID that indicates the depth at which the sample was taken. Aqueous samples (groundwater or surface water samples) are identified by the date the sample was collected. Other types of samples including quality control (TB, FB, and DUP), Vapor samples (AA, IA, SV or SVE), other soil type samples (IDW, sludge, free product, drum, and others) are also identified by a date. The following rules apply to the ID when using sample depth or sample date.

Sample Depth
The sample depth must be whole numbers (no fractions) separated by a hyphen. Thus for a soil sample collected from the soil boring SB-1 from a depth of 6 feet to 8 feet, the sample would be identified as:

SB01_6-8

Unfortunately, the NYSDEC EQuIS system does not accept fractions. Therefore, if your sample interval is a fraction of a foot (6.5-7.5), round up to the larger interval (6-8).

Sample Date
The sample date is always in the format of MMDDYY. Note that the year is two digits. Thus for a groundwater sample collected on July 1, 2015 from the monitoring well MW-1, the sample would be identified as:

MW01_070115

Special Cases
There are a couple of specific sample types that require further explanation.

Endpoint Sampling
End point sidewall samples are sometimes modified by magnetic direction (N, S, E, and W). For example, the first sidewall endpoint sample from the north wall of an excavation at a depth of 5 feet would be written as:

EPSW01_N_5

Again, note that the N in the identification refers to north and is separated from the prefix investigation code/numeric identifier and ID modifier suffix by underscores.

Vapor Extraction Well Sample
As with the sidewall endpoint samples, the sample name is altered by inserting a middle modifier between the prefix and suffix of the sample name. The middle modifier is used to identify the source of the sample (inlet sample port, midpoint sample port or outlet sample port). For example the midpoint port of the vapor extraction well number 1 sampled on July 1, 2015 would be written as;

SVE01_MID_070115

Matrix Spike and Matrix Spike Duplicate
On occasion, a Langan investigation will collect a sample to be used to provide the lab with a site specific medium to spike to determine the quality of the analytical method. This special case of sampling requires additional information to be used in the sample name, specifically, a suffix specifying whether the sample is the matrix spike (MS) or the matrix spike duplicate (MSD). In the following example, the sample is collected from soil boring number 1 at a depth of 2-4 feet. For the matrix spike sample:

SB01_2-4_MS

and for the matrix spike duplicate sample:

SB01_2-4_MSD

Multiple Interval Groundwater Sampling
Although not currently a common practice, low flow sampling facilitates stratigraphic sampling of a monitoring well. If the scope requires stratigraphic sampling then groundwater samples will be labeled with a lower case letter following the well number. For example, placing the pump or sampling tube at 10 feet below surface in MW01 on July 1, 2015 would require the sample to be labeled as:

MW01a_070115

While a second sample where the pump or tubing intake is placed at 20 feet would be labeled as:

MW01b_070115

Note that it is important that you record what depth the intake for each sample represents in your field notes; as this information is going to be critical to interpreting the results.

ATTACHMENT F

SAMPLING AND ANALYSIS PROTOCOLS

PFAS Field Sampling Guidelines for Groundwater and Soil

For Waters: 2 x 125 mL Bottles per sample filled to the neck of the bottle

PLEASE READ THESE INSTRUCTIONS PRIOR TO CONDUCTING SAMPLING

Sampling for PFAS for determination using EPA 537m can be challenging due to the prevalence of these compounds in consumer products. The following guidelines reflect current knowledge and are recommended when conducting sampling.

Consider Sampling for PFAS First...

Sample containers for other methods may have PFAS present on their sampling containers which could cross-contaminate your sample(s). We are analyzing down to the low parts-per-trillion (ppt) range so cross-contamination prevention is an important consideration.

SAMPLING

All Sampling done with Nitrile Gloves, provided by YORK

SAMPLE CONTAINERS

All sample containers - PP ONLY (Target list of 21 PFAS) Caps are unlined and made of PP (no Teflon® lined caps) Bottles are Batch Certified to be Target PFAS-free (< Reporting Limit)

FIELD EQUIPMENT

-Must not contain Teflon® (aka PTFE) or LDPE materials

-All sampling materials must be made from stainless steel, HDPE, acetate, silicone, or polypropylene

-No waterproof field notebooks can be used

-No plastic clipboards, binders, or the like

-No adhesives (e.g.Post-It® Notes, Duct tape) can be used

-Sharpies and permanent markers not allowed; regular ball point pens are acceptable

-Aluminum foil must not be used

-Keep PFAS samples in separate cooler, away from sampling containers that may contain PFAS

-Coolers filled with regular ice only - Do not use chemical (blue) ice packs

EQUIPMENT DECON

-"PFAS-free" water (e.g. Poland Spring*)-on-site for decontamination

-Only Alconox and Liquinox can be used for decontamination

* *Poland Spring has been demonstrated to be PFAS -free when freshly opened*

FIELD SAMPLING CLOTHING CONSIDERATIONS

Do not use fabric softener on clothing to be worn in field

Do not used cosmetics, moisturizers, hand cream, or other related products the morning of sampling

Do not use sunscreen or insect repellants

No materials containing Tyvek®

All safety boots made from polyurethane and PVC

No clothing or boots containing Gore-Tex®

Wet weather gear made of polyurethane and PVC only

FOOD CONSIDERATIONS

No food or drink when PFAS Sampling with exception of bottled water and/or hydration drinks (i.e., Gatorade and Powerade) that is available for consumption only in the staging area.

SAMPLE CONTAINER HANDLING

-For **AQUEOUS** Samples: Each sample set contains 2 x 125 mL containers. Fill each container to the neck

-For **SOILS**-1 x 250 mL container, FILL HALF WAY ONLY

-No preservative is necessary for this appliction at this time.

-Place closed, labeled Sample bottles into ZipLock bag.

-Dispose of Nitrile gloves in provided waste bag.

-Place in separate cooler from other samples, WET ICE only

-Follow instructions on next page for more detail.

-If you have a Quality Assurance Project Plan follow that guidance

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Rev 2.0 12/20

YORK
ANALYTICAL LABORATORIES INC

PFAS -Recommended Field Sampling Guidelines

PLEASE READ INSTRUCTIONS ENTIRELY PRIOR TO SAMPLING EVENT

Sampler should wash hands before wearing nitrile gloves in order to limit contamination during sampling. Each sample set* requires a set of containers to comply with the method as indicated below. **Sample set is composed of samples collected from the same sample site and at the same time.* **A pair of Nitrile gloves is included with each sample Zip-lock bag/bottle set. One Field Blank set per day is provided.**

Note: PP is Polypropylene

Sample Containers	Bottle Type	Preservation
2 Sampling Containers - Empty- per sample-Waters **SOILS- 1 Container-fill only half way**	125 mL PP container-Waters 250 mL PP for Soils	None, Cool <6C
1 PP Bottle with PFAS-free Water for Field Blank	125 mL PP container	None, Cool <6C
1 Field Blank (FRB) - Empty-per sampling day	125 mL PP container	None, Cool <6C
2 - Empty PP bottles for MS/DUP when needed (Soils MS/DUP come from same Bottle)	125 mL PP container	None, Cool <6C

NOTE: Sampling containers for WATERS must be filled to the neck. **SOILS, fill bottle only 1/2 full**

FIELD BLANK and MS/DUP Bottles are labeled with NEON GREEN LABELS

Field blanks are required per sampling event day and the containers have been provided. Follow the instructions below.

Field Blank Instructions:

1. Locate the PFAS Field Blank bottle (empty, labeled) supplied The PFAS Field Blank Water container is pre-filled at YORK with PFAS-free water to transfer to the empty PFAS Field Blank bottle.
2. Locate the empty container labeled "Field Blank" with Neon green labels
3. Open both containers and proceed to transfer contents of the "PFAS FIELD BLANK WATER" container into the "PFAS FIELD BLANK" Bottle
4. Field Blanks to be analyzed must be listed on the Chain-of-Custody.
5. Both the empty Field Blank water container and the filled Field Blank container must be returned to YORK along with the samples taken.

Matrix Spike/ Matrix Dup Instructions: Note: Soil MS/MSD can be from the same container as the sample

1. Locate the PFAS MS and DUP bottles (empty, labeled-NEON GREEN) supplied -normally 1 set per 20 field samples
2. Transfer chosen Field MS /Dup as a normal sample and indicate sample ID on container and on Chain-of-Custody

Sampling Instructions: ALL SAMPLE BOTTLES HAVE NEON YELLOW LABELS

1. Do not overfill or rinse the container. Any sample(s) for Matrix Spike and Matrix Duplicates are treated similarly.
2. Close containers securely. Label legibly and place containers in ZipLoc® bags, and in a separate cooler (no other container types).
3. Ensure Chain-of-Custody and all sample labels contain required information. Place all samples in separate coolers (separate from other samples for different parameters). Place wet ice (bagged) on samples for return to YORK. Samples should be kept at 4°C ±2. Samples must not exceed 10°C during first 48 hours after collection. **Hold time is 14 days.**

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Department of Environmental Conservation

SAMPLING, ANALYSIS, AND ASSESSMENT OF PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS)

Under NYSDEC's Part 375 Remedial Programs

April 2023

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ERRATA SHEET for

SAMPLING, ANALYSIS, AND ASSESSMENT OF PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) Under NYSDEC's Part 375 Remedial Programs Issued January 17, 2020

Citation and Page Number	Current Text	Corrected Text	Date
Title of Appendix I, page 32	Appendix H	Appendix I	2/25/2020
Document Cover, page 1	Guidelines for Sampling and Analysis of PFAS	Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs	9/15/2020
Data Assessment and Application to Site Cleanup Page 3	Until such time as Ambient Water Quality Standards (AWQS) and Soil Cleanup Objectives (SCOs) for PFOA and PFOS are published	Until such time as Soil Cleanup Objectives (SCOs) for PFOA and PFOS are published	3/28/2023
Water Sample Results Page 3	PFOA and PFOS should be further assessed and considered as potential contaminants of concern in groundwater or surface water if PFOA or PFOS is detected in any water sample at or above 10 ng/L (ppt) and is determined to be attributable to the site, either by a comparison of upgradient and downgradient levels, or the presence of soil source areas, as defined below.	NYSDEC has adopted ambient water quality guidance values for PFOA and PFOS. Groundwater samples should be compared to the human health criteria of 6.7 ng/l (ppt) for PFOA and 2.7 ng/l (ppt) for PFOS. These guidance values also include criteria for surface water for PFOS applicable for aquatic life, which may be applicable at some sites. Drinking water sample results should be compared to the NYS maximum contaminant level (MCL) of 10 ng/l (ppt).Analysis to determine if PFOA and PFOS concentrations are attributable to the site should include a comparison between upgradient and downgradient levels, and the presence of soil source areas, as defined below.	3/28/2023
Soil Sample Results Page 3	Soil cleanup objectives for PFOA and PFOS have been proposed in an upcoming revision to 6 NYCRR Part 375-6. Until SCOs are in effect, the following are to be used as guidance values:	NYSDEC will delay adding soil cleanup objectives for PFOA and PFOS to 6 NYCRR Part 375-6 until the PFAS rural soil background study has been completed. Until SCOs are in effect, the following are to be used as guidance values:	3/28/2023
Protection of Groundwater Page 3	PFOA (ppb) 1.1 PFOS (ppb) 3.7	PFOA (ppb) 0.8 PFOS (ppb) 1.0	3/28/2023

Citation and Page Number	Current Text	Corrected Text	Date
Footnote 2 Page 3	The movement of PFAS in the environment is being aggressively researched at this time; that research will eventually result in more accurate models for the behaviors of these chemicals. In the meantime, DEC has calculated the guidance value for the protection of groundwater using the same procedure used for all other chemicals, as described in Section 7.7 of the Technical Support Document (http://www.dec.ny.gov/docs/remediation_hudson_pdf/techsuppdoc.pdf).	The Protection of Groundwater values are based on the above referenced ambient groundwater guidance values. Details on that calculation are available in the following document, prepared for the February 2022 proposed changes to Part 375 (https://www.dec.ny.gov/docs/remediation_hudson_pdf/part375techsupport.pdf). The movement of PFAS in the environment is being aggressively researched at this time; that research will eventually result in more accurate models for the behaviors of these chemicals. In the meantime, DEC has calculated the guidance value for the protection of groundwater using the same procedure used for all other chemicals, as described in Section 7.7 of the Technical Support Document (http://www.dec.ny.gov/docs/remediation_hudson_pdf/techsuppdoc.pdf).	3/28/2023
Testing for Imported Soil Page 4	If the concentrations of PFOA and PFOS in leachate are at or above 10 ppt (the Maximum Contaminant Levels established for drinking water by the New York State Department of Health), then the soil is not acceptable.	If the concentrations of PFOA and PFOS in leachate are at or above the ambient water quality guidance values for groundwater, then the soil is not acceptable.	3/28/2023
Routine Analysis, page 9	"However, laboratories analyzing environmental samples…PFOA and PFOS in drinking water by EPA Method 537, 537.1 or ISO 25101."	"However, laboratories analyzing environmental samples…PFOA and PFOS in drinking water by EPA Method 537, 537.1, ISO 25101, or Method 533."	9/15/2020
Additional Analysis, page 9, new paragraph regarding soil parameters	None	"In cases where site-specific cleanup objectives for PFOA and PFOS are to be assessed, soil parameters, such as Total Organic Carbon (EPA Method 9060), soil pH (EPA Method 9045), clay content (percent), and cation exchange capacity (EPA Method 9081), should be included in the analysis to help evaluate factors affecting the leachability of PFAS in site soils."	9/15/2020

Citation and Page Number	Current Text	Corrected Text	Date
Data Assessment and Application to Site Cleanup Page 10	Until such time as Ambient Water Quality Standards (AWQS) and Soil Cleanup Objectives (SCOs) for PFAS are published, the extent of contaminated media potentially subject to remediation should be determined on a case-by-case basis using the procedures discussed below and the criteria in DER-10. Target levels for cleanup of PFAS in other media, including biota and sediment, have not yet been established by the DEC.	Until such time as Ambient Water Quality Standards (AWQS) and Soil Cleanup Objectives (SCOs) for PFOA and PFOS are published, the extent of contaminated media potentially subject to remediation should be determined on a case-by-case basis using the procedures discussed below and the criteria in DER-10. Preliminary target levels for cleanup of PFOA and PFOS in other media, including biota and sediment, have not yet been established by the DEC.	9/15/2020
Water Sample Results Page 10	PFAS should be further assessed and considered as a potential contaminant of concern in groundwater or surface water (…) If PFAS are identified as a contaminant of concern for a site, they should be assessed as part of the remedy selection process in accordance with Part 375 and DER-10.	PFOA and PFOS should be further assessed and considered as potential contaminants of concern in groundwater or surface water (…) If PFOA and/or PFOS are identified as contaminants of concern for a site, they should be assessed as part of the remedy selection process in accordance with Part 375 and DER-10.	9/15/2020

Citation and Page Number	Current Text	Corrected Text	Date
Soil Sample Results, page 10	"The extent of soil contamination for purposes of delineation and remedy selection should be determined by having certain soil samples tested by Synthetic Precipitation Leaching Procedure (SPLP) and the leachate analyzed for PFAS. Soil exhibiting SPLP results above 70 ppt for either PFOA or PFOS (individually or combined) are to be evaluated during the cleanup phase."	"Soil cleanup objectives for PFOA and PFOS will be proposed in an upcoming revision to 6 NYCRR Part 375-6. Until SCOs are in effect, the following are to be used as guidance values. " [Interim SCO Table] "PFOA and PFOS results for soil are to be compared against the guidance values listed above. These guidance values are to be used in determining whether PFOA and PFOS are contaminants of concern for the site and for determining remedial action objectives and cleanup requirements. Site-specific remedial objectives for protection of groundwater can also be presented for evaluation by DEC. Development of site-specific remedial objectives for protection of groundwater will require analysis of additional soil parameters relating to leachability. These additional analyses can include any or all the parameters listed above (soil pH, cation exchange capacity, etc.) and/or use of SPLP. As the understanding of PFAS transport improves, DEC welcomes proposals for site-specific remedial objectives for protection of groundwater. DEC will expect that those may be dependent on additional factors including soil pH, aqueous pH, % organic carbon, % Sand/Silt/Clay, soil cations: K, Ca, Mg, Na, Fe, Al, cation exchange capacity, and anion exchange capacity. Site-specific remedial objectives should also consider the dilution attenuation factor (DAF). The NJDEP publication on DAF can be used as a reference: https://www.nj.gov/dep/srp/guidance/rs/daf.pdf. "	9/15/2020

Citation and Page Number	Current Text	Corrected Text	Date
Testing for Imported Soil Page 11	Soil imported to a site for use in a soil cap, soil cover, or as backfill is to be tested for PFAS in general conformance with DER-10, Section 5.4(e) for the PFAS Analyte List (Appendix F) using the analytical procedures discussed below and the criteria in DER-10 associated with SVOCs. If PFOA or PFOS is detected in any sample at or above 1 µg/kg, then soil should be tested by SPLP and the leachate analyzed for PFAS. If the SPLP results exceed 10 ppt for either PFOA or PFOS (individually) then the source of backfill should be rejected, unless a site-specific exemption is provided by DER. SPLP leachate criteria is based on the Maximum Contaminant Levels proposed for drinking water by New York State's Department of Health, this value may be updated based on future Federal or State promulgated regulatory standards. Remedial parties have the option of analyzing samples concurrently for both PFAS in soil and in the SPLP leachate to minimize project delays. Category B deliverables should be submitted for backfill samples, though a DUSR is not required.	Testing for PFAS should be included any time a full TAL/TCL analyte list is required. Results for PFOA and PFOS should be compared to the applicable guidance values. If PFOA or PFOS is detected in any sample at or above the guidance values then the source of backfill should be rejected, unless a site-specific exemption is provided by DER based on SPLP testing, for example. If the concentrations of PFOA and PFOS in leachate are at or above 10 ppt (the Maximum Contaminant Levels established for drinking water by the New York State Department of Health), then the soil is not acceptable. PFOA, PFOS and 1,4-dioxane are all considered semi-volatile compounds, so composite samples are appropriate for these compounds when sampling in accordance with DER-10, Table 5.4(e)10. Category B deliverables should be submitted for backfill samples, though a DUSR is not required.	9/15/2020

Citation and Page Number	Current Text	Corrected Text	Date
Footnotes	None	[1] TOP Assay analysis of highly contaminated samples, such as those from an AFFF (aqueous film-forming foam) site, can result in incomplete oxidation of the samples and an underestimation of the total perfluoroalkyl substances. [2] The movement of PFAS in the environment is being aggressively researched at this time; that research will eventually result in more accurate models for the behaviors of these chemicals. In the meantime, DEC has calculated the soil cleanup objective for the protection of groundwater using the same procedure used for all other chemicals, as described in Section 7.7 of the Technical Support Document (http://www.dec.ny.gov/docs/remediation_hudson_pdf/techsuppdoc.pdf).	9/15/2020
Additional Analysis, page 9	In cases… soil parameters, such as Total Organic Carbon (EPA Method 9060), soil…	In cases… soil parameters, such as Total Organic Carbon (Lloyd Kahn), soil…	1/8/2021
Appendix A, General Guidelines, fourth bullet	List the ELAP-approved lab(s) to be used for analysis of samples	List the ELAP- certified lab(s) to be used for analysis of samples	1/8/2021
Appendix E, Laboratory Analysis and Containers	Drinking water samples collected using this protocol are intended to be analyzed for PFAS by ISO Method 25101.	Drinking water samples collected using this protocol are intended to be analyzed for PFAS by EPA Method 537, 537.1, 533, or ISO Method 25101	1/8/2021
Water Sample Results Page 9	"In addition, further assessment of water may be warranted if either of the following screening levels are met: a. any other individual PFAS (not PFOA or PFOS) is detected in water at or above 100 ng/L; or b. total concentration of PFAS (including PFOA and PFOS) is detected in water at or above 500 ng/L"	Deleted	6/15/2021

Citation and Page Number	Current Text	Corrected Text	Date
Routine Analysis, Page XX	Currently, New York State Department of Health's Environmental Laboratory Approval Program (ELAP)… criteria set forth in the DER's laboratory guidelines for PFAS in non-potable water and solids (Appendix H - Laboratory Guidelines for Analysis of PFAS in Non-Potable Water and Solids).	Deleted	5/31/2022
Analysis and Reporting, Page XX	As of October 2020, the United States Environmental Protection Agency (EPA) does not have a validated method for analysis of PFAS for media commonly analyzed under DER remedial programs (non-potable waters, solids). DER has developed the following guidelines to ensure consistency in analysis and reporting of PFAS.	Deleted	5/31/2022
Routine Analysis, Page XX	LC-MS/MS analysis for PFAS using methodologies based on EPA Method 537.1 is the procedure to use for environmental samples. Isotope dilution techniques should be utilized for the analysis of PFAS in all media.	EPA Method 1633 is the procedure to use for environmental samples.	
Soil Sample Results, Page XX	Soil cleanup objectives for PFOA and PFOS will be proposed in an upcoming revision to 6 NYCRR Part 375-6	Soil cleanup objectives for PFOA and PFOS have been proposed in an upcoming revision to 6 NYCRR Part 375-6	
Appendix A	"Include in the text… LC-MS/MS for PFAS using methodologies based on EPA Method 537.1"	"Include in the text ….EPA Method 1633"	
Appendix A	"Laboratory should have ELAP certification for PFOA and PFOS in drinking water by EPA Method 537, 537.1, EPA Method 533, or ISO 25101"	Deleted	
Appendix B	"Samples collected using this protocol are intended to be analyzed for PFAS using methodologies based on EPA Method 537.1"	"Samples collected using this protocol are intended to be analyzed for PFAS using EPA Method 1633"	

Citation and Page Number	Current Text	Corrected Text	Date
Appendix C	"Samples collected using this protocol are intended to be analyzed for PFAS using methodologies based on EPA Method 537.1"	"Samples collected using this protocol are intended to be analyzed for PFAS using EPA Method 1633"	
Appendix D	"Samples collected using this protocol are intended to be analyzed for PFAS using methodologies based on EPA Method 537.1"	"Samples collected using this protocol are intended to be analyzed for PFAS using EPA Method 1633"	
Appendix G		Updated to include all forty PFAS analytes in EPA Method 533	
Appendix H		Deleted	
Appendix I	Appendix I	Appendix H	
Appendix H	"These guidelines are intended to be used for the validation of PFAS analytical results for projects within the Division of Environmental Remediation (DER) as well as aid in the preparation of a data usability summary report."	"These guidelines are intended to be used for the validation of PFAS using EPA Method 1633 for projects within the Division of Environmental Remediation (DER)."	
Appendix H	"The holding time is 14 days…"	"The holding time is 28 days…"	
Appendix H, Initial Calibration	"The initial calibration should contain a minimum of five standards for linear fit…"	"The initial calibration should contain a minimum of six standards for linear fit…"	
Appendix H, Initial Calibration	Linear fit calibration curves should have an R^2 value greater than 0.990.	Deleted	
Appendix H, Initial Calibration Verification	Initial Calibration Verification Section	Deleted	
Appendix H	secondary Ion Monitoring Section	Deleted	
Appendix H	Branched and Linear Isomers Section	Deleted	

Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs

Objective

New York State Department of Environmental Conservation's Division of Environmental Remediation (DER) performs or oversees sampling of environmental media and subsequent analysis of PFAS as part of remedial programs implemented under 6 NYCRR Part 375. To ensure consistency in sampling, analysis, reporting, and assessment of PFAS, DER has developed this document which summarizes currently accepted procedures and updates previous DER technical guidance pertaining to PFAS.

Applicability

All work plans submitted to DEC pursuant to one of the remedial programs under Part 375 shall include PFAS sampling and analysis procedures that conform to the guidelines provided herein.

As part of a site investigation or remedial action compliance program, whenever samples of potentially affected media are collected and analyzed for the standard Target Analyte List/Target Compound List (TAL/TCL), PFAS analysis should also be performed. Potentially affected media can include soil, groundwater, surface water, and sediment. Based upon the potential for biota to be affected, biota sampling and analysis for PFAS may also be warranted as determined pursuant to a Fish and Wildlife Impact Analysis. Soil vapor sampling for PFAS is not required.

Field Sampling Procedures

DER-10 specifies technical guidance applicable to DER's remedial programs. Given the prevalence and use of PFAS, DER has developed "best management practices" specific to sampling for PFAS. As specified in DER-10 Chapter 2, quality assurance procedures are to be submitted with investigation work plans. Typically, these procedures are incorporated into a work plan, or submitted as a stand-alone document (e.g., a Quality Assurance Project Plan). Quality assurance guidelines for PFAS are listed in Appendix A - Quality Assurance Project Plan (QAPP) Guidelines for PFAS.

Field sampling for PFAS performed under DER remedial programs should follow the appropriate procedures outlined for soils, sediments, or other solids (Appendix B), non-potable groundwater (Appendix C), surface water (Appendix D), public or private water supply wells (Appendix E), and fish tissue (Appendix F).

QA/QC samples (e.g. duplicates, MS/MSD) should be collected as specified in DER-10, Section 2.3(c). For sampling equipment coming in contact with aqueous samples only, rinsate or equipment blanks should be collected. Equipment blanks should be collected at a minimum frequency of one per day per site or one per twenty samples, whichever is more frequent.

Analysis and Reporting

The investigation work plan should describe analysis and reporting procedures, including laboratory analytical procedures for the methods discussed below. As specified in DER-10 Section 2.2, laboratories should provide a full Category B deliverable. In addition, a Data Usability Summary Report (DUSR) should be prepared by an independent, third-party data validator. Electronic data submissions should meet the requirements provided at: https://www.dec.ny.gov/chemical/62440.html.

DER has developed a *PFAS Analyte List* (Appendix G) for remedial programs to understand the nature of contamination at sites. It is expected that reported results for PFAS will include, at a minimum, all the compounds listed. If lab and/or matrix specific issues are encountered for any analytes, the DER project manager, in consultation with the DER chemist, will make case-by-case decisions as to whether certain analytes may be temporarily or permanently discontinued from analysis at each site. As with other contaminants that are analyzed for at a site, the *PFAS Analyte List* may be refined for future sampling events based on investigative findings.

Routine Analysis

EPA Method 1633 is the procedure to use for environmental samples. Reporting limits for PFOA and PFOS in aqueous samples should not exceed 2 ng/L. Reporting limits for PFOA and PFOS in solid samples should not exceed 0.5 µg/kg. Reporting limits for all other PFAS in aqueous and solid media should be as close to these limits as possible. If laboratories indicate that they are not able to achieve these reporting limits for the entire *PFAS Analyte List*, site-specific decisions regarding acceptance of elevated reporting limits for specific PFAS can be made by the DER project manager in consultation with the DER chemist. Data review guidelines were developed by DER to ensure data comparability and usability (Appendix H - Data Review Guidelines for Analysis of PFAS in Non-Potable Water and Solids).

Additional Analysis

Additional laboratory methods for analysis of PFAS may be warranted at a site, such as the Synthetic Precipitation Leaching Procedure (SPLP) and Total Oxidizable Precursor Assay (TOP Assay).

In cases where site-specific cleanup objectives for PFOA and PFOS are to be assessed, soil parameters, such as Total Organic Carbon (Lloyd Kahn), soil pH (EPA Method 9045), clay content (percent), and cation exchange capacity (EPA Method 9081), should be included in the analysis to help evaluate factors affecting the leachability of PFAS in site soils.

SPLP is a technique used to determine the mobility of chemicals in liquids, soils and wastes, and may be useful in determining the need for addressing PFAS-containing material as part of the remedy. SPLP by EPA Method 1312 should be used unless otherwise specified by the DER project manager in consultation with the DER chemist.

Impacted materials can be made up of PFAS that are not analyzable by routine analytical methodology. A TOP Assay can be utilized to conceptualize the amount and type of oxidizable PFAS which could be liberated in the environment, which approximates the maximum concentration of perfluoroalkyl substances that could be generated if all polyfluoroalkyl substances were oxidized. For example, some polyfluoroalkyl substances may degrade or transform to form perfluoroalkyl substances (such as PFOA or PFOS), resulting in an increase in perfluoroalkyl substance concentrations as contaminated groundwater moves away from a source. The TOP Assay converts, through oxidation, polyfluoroalkyl substances (precursors) into perfluoroalkyl substances that can be detected by routine analytical methodology.[1]

[1] TOP Assay analysis of highly contaminated samples, such as those from an AFFF (aqueous film-forming foam) site, can result in incomplete oxidation of the samples and an underestimation of the total perfluoroalkyl substances.

Commercial laboratories have adopted methods which allow for the quantification of targeted PFAS in air and biota. The EPA's Office of Research and Development (ORD) is currently developing methods which allow for air emissions characterization of PFAS, including both targeted and non-targeted analysis of PFAS. Consult with the DER project manager and the DER chemist for assistance on analyzing biota/tissue and air samples.

Data Assessment and Application to Site Cleanup

Until such time as Soil Cleanup Objectives (SCOs) for PFOA and PFOS are published, the extent of contaminated media potentially subject to remediation should be determined on a case-by-case basis using the procedures discussed below and the criteria in DER-10. Preliminary target levels for cleanup of PFOA and PFOS in other media, including biota and sediment, have not yet been established by the DEC.

Water Sample Results

NYSDEC has adopted ambient water quality guidance values for PFOA and PFOS. Groundwater samples should be compared to the human health criteria of 6.7 ng/l (ppt) for PFOA and 2.7 ng/l (ppt) for PFOS. These human health criteria should also be applied to surface water that is used as a water supply. This guidance also includes criteria for surface water for PFOS applicable for aquatic life, which may be applicable at some sites. Drinking water sample results should be compared to the NYS maximum contaminant level (MCL) of 10 ng/l (ppt). Analysis to determine if PFOA and PFOS concentrations are attributable to the site should include a comparison between upgradient and downgradient levels, and the presence of soil source areas, as defined below.

If PFOA and/or PFOS are identified as contaminants of concern for a site, they should be assessed as part of the remedy selection process in accordance with Part 375 and DER-10.

Soil Sample Results

NYSDEC will delay adding soil cleanup objectives for PFOA and PFOS to 6 NYCRR Part 375-6 until the PFAS rural soil background study has been completed. Until SCOs are in effect, the following are to be used as guidance values:

Guidance Values for Anticipated Site Use	PFOA (ppb)	PFOS (ppb)
Unrestricted	0.66	0.88
Residential	6.6	8.8
Restricted Residential	33	44
Commercial	500	440
Industrial	600	440
Protection of Groundwater[2]	0.8	1.0

PFOA and PFOS results for soil are to be compared against the guidance values listed above. These guidance values are to be used in determining whether PFOA and PFOS are contaminants of concern for the site and for determining remedial action objectives and cleanup requirements. Site-specific remedial objectives for protection of groundwater can also be presented for evaluation by DEC. Development of site-specific remedial objectives for protection of groundwater will require analysis of additional soil parameters relating to leachability. These

[2] The Protection of Groundwater values are based on the above referenced ambient groundwater guidance values. Details on that calculation are available in the following document, prepared for the February 2022 proposed changes to Part 375 (https://www.dec.ny.gov/docs/remediation_hudson_pdf/part375techsupport.pdf). The movement of PFAS in the environment is being aggressively researched at this time; that research will eventually result in more accurate models for the behaviors of these chemicals. In the meantime, DEC has calculated the guidance value for the protection of groundwater using the same procedure used for all other chemicals, as described in Section 7.7 of the Technical Support Document (http://www.dec.ny.gov/docs/remediation_hudson_pdf/techsuppdoc.pdf).

additional analyses can include any or all the parameters listed above (soil pH, cation exchange capacity, etc.) and/or use of SPLP.

As the understanding of PFAS transport improves, DEC welcomes proposals for site-specific remedial objectives for protection of groundwater. DEC will expect that those may be dependent on additional factors including soil pH, aqueous pH, % organic carbon, % Sand/Silt/Clay, soil cations: K, Ca, Mg, Na, Fe, Al, cation exchange capacity, and anion exchange capacity. Site-specific remedial objectives should also consider the dilution attenuation factor (DAF). The NJDEP publication on DAF can be used as a reference: https://www.nj.gov/dep/srp/guidance/rs/daf.pdf.

Testing for Imported Soil

Testing for PFAS should be included any time a full TAL/TCL analyte list is required. Results for PFOA and PFOS should be compared to the applicable guidance values. If PFOA or PFOS is detected in any sample at or above the guidance values then the source of backfill should be rejected, unless a site-specific exemption is provided by DER based on SPLP testing, for example. If the concentrations of PFOA and PFOS in leachate are at or above the ambient water quality guidance values for groundwater, then the soil is not acceptable.

PFOA, PFOS and 1,4-dioxane are all considered semi-volatile compounds, so composite samples are appropriate for these compounds when sampling in accordance with DER-10, Table 5.4(e)10. Category B deliverables should be submitted for backfill samples, though a DUSR is not required.

Appendix A - Quality Assurance Project Plan (QAPP) Guidelines for PFAS

The following guidelines (general and PFAS-specific) can be used to assist with the development of a QAPP for projects within DER involving sampling and analysis of PFAS.

General Guidelines in Accordance with DER-10

- Document/work plan section title – Quality Assurance Project Plan
- Summarize project scope, goals, and objectives
- Provide project organization including names and resumes of the project manager, Quality Assurance Officer (QAO), field staff, and Data Validator
    - The QAO should not have another position on the project, such as project or task manager, that involves project productivity or profitability as a job performance criterion
- List the ELAP certified lab(s) to be used for analysis of samples
- Include a site map showing sample locations
- Provide detailed sampling procedures for each matrix
- Include Data Quality Usability Objectives
- List equipment decontamination procedures
- Include an "Analytical Methods/Quality Assurance Summary Table" specifying:
    - Matrix type
    - Number or frequency of samples to be collected per matrix
    - Number of field and trip blanks per matrix
    - Analytical parameters to be measured per matrix
    - Analytical methods to be used per matrix with minimum reporting limits
    - Number and type of matrix spike and matrix spike duplicate samples to be collected
    - Number and type of duplicate samples to be collected
    - Sample preservation to be used per analytical method and sample matrix
    - Sample container volume and type to be used per analytical method and sample matrix
    - Sample holding time to be used per analytical method and sample matrix
- Specify Category B laboratory data deliverables and preparation of a DUSR

Specific Guidelines for PFAS

- Include in the text that sampling for PFAS will take place
- Include in the text that PFAS will be analyzed by EPA Method 1633
- Include the list of PFAS compounds to be analyzed (*PFAS Analyte List*)
- Include the laboratory SOP for PFAS analysis
- List the minimum method-achievable Reporting Limits for PFAS
    - Reporting Limits should be less than or equal to:
        - Aqueous – 2 ng/L (ppt)
        - Solids – 0.5 µg/kg (ppb)
- Include the laboratory Method Detection Limits for the PFAS compounds to be analyzed
-
- Include detailed sampling procedures
    - Precautions to be taken
    - Pump and equipment types
    - Decontamination procedures
    - Approved materials only to be used
- Specify that regular ice only will be used for sample shipment
- Specify that equipment blanks should be collected at a minimum frequency of 1 per day per site for each matrix

Appendix B - Sampling Protocols for PFAS in Soils, Sediments and Solids

General

The objective of this protocol is to give general guidelines for the collection of soil, sediment and other solid samples for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Containers

Samples collected using this protocol are intended to be analyzed for PFAS using EPA Method 1633.

The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in to contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials including sample bottle cap liners with a PTFE layer.

A list of acceptable equipment is provided below, but other equipment may be considered appropriate based on sampling conditions.

- stainless steel spoon
- stainless steel bowl
- steel hand auger or shovel without any coatings

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification.

Sampling Techniques

Sampling is often conducted in areas where a vegetative turf has been established. In these cases, a pre-cleaned trowel or shovel should be used to carefully remove the turf so that it may be replaced at the conclusion of sampling. Surface soil samples (e.g. 0 to 6 inches below surface) should then be collected using a pre-cleaned, stainless steel spoon. Shallow subsurface soil samples (e.g. 6 to ~36 inches below surface) may be collected by digging a hole using a pre-cleaned hand auger or shovel. When the desired subsurface depth is reached, a pre-cleaned hand auger or spoon shall be used to obtain the sample.

When the sample is obtained, it should be deposited into a stainless steel bowl for mixing prior to filling the sample containers. The soil should be placed directly into the bowl and mixed thoroughly by rolling the material into the middle until the material is homogenized. At this point the material within the bowl can be placed into the laboratory provided container.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at 4 ± 2º Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- Request appropriate data deliverable (Category B) and an electronic data deliverable

Documentation

A soil log or sample log shall document the location of the sample/borehole, depth of the sample, sampling equipment, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate. Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appropriate rain gear (PVC, polyurethane, or rubber rain gear are acceptable), bug spray, and sunscreen should be used that does not contain PFAS. Well washed cotton coveralls may be used as an alternative to bug spray and/or sunscreen.

PPE that contains PFAS is acceptable when site conditions warrant additional protection for the samplers and no other materials can be used to be protective. Documentation of such use should be provided in the field notes.

Appendix C - Sampling Protocols for PFAS in Monitoring Wells

General

The objective of this protocol is to give general guidelines for the collection of groundwater samples for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Container

Samples collected using this protocol are intended to be analyzed for PFAS using EPA Method 1633.

The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include: stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials including plumbers tape and sample bottle cap liners with a PTFE layer.

A list of acceptable equipment is provided below, but other equipment may be considered appropriate based on sampling conditions.

- stainless steel inertia pump with HDPE tubing
- peristaltic pump equipped with HDPE tubing and silicone tubing
- stainless steel bailer with stainless steel ball
- bladder pump (identified as PFAS-free) with HDPE tubing

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification.

Sampling Techniques

Monitoring wells should be purged in accordance with the sampling procedure (standard/volume purge or low flow purge) identified in the site work plan, which will determine the appropriate time to collect the sample. If sampling using standard purge techniques, additional purging may be needed to reduce turbidity levels, so samples contain a limited amount of sediment within the sample containers. Sample containers that contain sediment may cause issues at the laboratory, which may result in elevated reporting limits and other issues during the sample preparation that can compromise data usability. Sampling personnel should don new nitrile gloves prior to sample collection due to the potential to contact PFAS containing items (not related to the sampling equipment) during the purging activities.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at 4 ± 2º Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- Collect one equipment blank per day per site and minimum 1 equipment blank per 20 samples. The equipment blank shall test the new and decontaminated sampling equipment utilized to obtain a sample for residual PFAS contamination. This sample is obtained by using laboratory provided PFAS-free water and passing the water over or through the sampling device and into laboratory provided sample containers
- Additional equipment blank samples may be collected to assess other equipment that is utilized at the monitoring well
- Request appropriate data deliverable (Category B) and an electronic data deliverable

Documentation

A purge log shall document the location of the sample, sampling equipment, groundwater parameters, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate. Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appropriate rain gear (PVC, polyurethane, or rubber rain gear are acceptable), bug spray, and sunscreen should be used that does not contain PFAS. Well washed cotton coveralls may be used as an alternative to bug spray and/or sunscreen.

PPE that contains PFAS is acceptable when site conditions warrant additional protection for the samplers and no other materials can be used to be protective. Documentation of such use should be provided in the field notes.

Appendix D - Sampling Protocols for PFAS in Surface Water

General

The objective of this protocol is to give general guidelines for the collection of surface water samples for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Container

Samples collected using this protocol are intended to be analyzed for PFAS using EPA Method 1633.

The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include: stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials including sample bottle cap liners with a PTFE layer.

A list of acceptable equipment is provided below, but other equipment may be considered appropriate based on sampling conditions.

- stainless steel cup

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification.

Sampling Techniques

Where conditions permit, (e.g. creek or pond) sampling devices (e.g. stainless steel cup) should be rinsed with site medium to be sampled prior to collection of the sample. At this point the sample can be collected and poured into the sample container.

If site conditions permit, samples can be collected directly into the laboratory container.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at 4 ± 2º Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- Collect one equipment blank per day per site and minimum 1 equipment blank per 20 samples. The equipment blank shall test the new and decontaminated sampling equipment utilized to obtain a sample for residual PFAS contamination. This sample is obtained by using laboratory provided PFAS-free water and passing the water over or through the sampling device and into laboratory provided sample containers
- Request appropriate data deliverable (Category B) and an electronic data deliverable

Documentation

A sample log shall document the location of the sample, sampling equipment, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate. Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appropriate rain gear (PVC, polyurethane, or rubber rain gear are acceptable), bug spray, and sunscreen should be used that does not contain PFAS. Well washed cotton coveralls may be used as an alternative to bug spray and/or sunscreen.

PPE that contains PFAS is acceptable when site conditions warrant additional protection for the samplers and no other materials can be used to be protective. Documentation of such use should be provided in the field notes.

Appendix E - Sampling Protocols for PFAS in Private Water Supply Wells

General

The objective of this protocol is to give general guidelines for the collection of water samples from private water supply wells (with a functioning pump) for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Container

Drinking water samples collected using this protocol are intended to be analyzed for PFAS by EPA Method 537, 537.1, 533, or ISO Method 25101. The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials (e.g. plumbers tape), including sample bottle cap liners with a PTFE layer.

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification.

Sampling Techniques

Locate and assess the pressure tank and determine if any filter units are present within the building. Establish the sample location as close to the well pump as possible, which is typically the spigot at the pressure tank. Ensure sampling equipment is kept clean during sampling as access to the pressure tank spigot, which is likely located close to the ground, may be obstructed and may hinder sample collection.

Prior to sampling, a faucet downstream of the pressure tank (e.g., washroom sink) should be run until the well pump comes on and a decrease in water temperature is noted which indicates that the water is coming from the well. If the homeowner is amenable, staff should run the water longer to purge the well (15+ minutes) to provide a sample representative of the water in the formation rather than standing water in the well and piping system including the pressure tank. At this point a new pair of nitrile gloves should be donned and the sample can be collected from the sample point at the pressure tank.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at 4 ± 2º Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- If equipment was used, collect one equipment blank per day per site and a minimum 1 equipment blank per 20 samples. The equipment blank shall test the new and decontaminated sampling equipment utilized to obtain a sample for residual PFAS contamination. This sample is obtained by using laboratory provided PFAS-free water and passing the water over or through the sampling device and into laboratory provided sample containers.
- A field reagent blank (FRB) should be collected at a rate of one per 20 samples. The lab will provide a FRB bottle containing PFAS free water and one empty FRB bottle. In the field, pour the water from the one bottle into the empty FRB bottle and label appropriately.
- Request appropriate data deliverable (Category B) and an electronic data deliverable
- For sampling events where multiple private wells (homes or sites) are to be sampled per day, it is acceptable to collect QC samples at a rate of one per 20 across multiple sites or days.

Documentation

A sample log shall document the location of the private well, sample point location, owner contact information, sampling equipment, purge duration, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate and available (e.g. well construction, pump type and location, yield, installation date). Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appendix F - Sampling Protocols for PFAS in Fish

This appendix contains a copy of the current SOP developed by the Division of Fish and Wildlife (DFW) entitled "General Fish Handling Procedures for Contaminant Analysis" (Ver. 8). This SOP should be followed when collecting fish for contaminant analysis. Note, however, that the Bureau of Ecosystem Health will not be supplying bags or tags. All supplies are the responsibility of the collector

Procedure Name: General Fish Handling Procedures for Contaminant Analysis

Number: FW-005

Purpose: This procedure describes data collection, fish processing and delivery of fish collected for contaminant monitoring. It contains the chain of custody and collection record forms that should be used for the collections.

Organization: Environmental Monitoring Section
Bureau of Ecosystem Health
Division of Fish and Wildlife (DFW)
New York State Department of Environmental Conservation (NYSDEC)
625 Broadway
Albany, New York 12233-4756

Version: 8

Previous Version Date: 21 March 2018

Summary of Changes to this Version: Updated bureau name to Bureau of Ecosystem Health. Added direction to list the names of all field crew on the collection record. Minor formatting changes on chain of custody and collection records.

Originator or Revised by: Wayne Richter, Jesse Becker

Date: 26 April 2019

Quality Assurance Officer and Approval Date: Jesse Becker, 26 April 2019

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

GENERAL FISH HANDLING PROCEDURES FOR CONTAMINANT ANALYSES

A. Original copies of all continuity of evidence (i.e., Chain of Custody) and collection record forms must accompany delivery of fish to the lab. A copy shall be directed to the Project Leader or as appropriate, Wayne Richter. All necessary forms will be supplied by the Bureau of Ecosystem Health. Because some samples may be used in legal cases, it is critical that each section is filled out completely. Each Chain of Custody form has three main sections:

   1. The top box is to be filled out **and signed** by the person responsible for the fish collection (e.g., crew leader, field biologist, researcher). This person is responsible for delivery of the samples to DEC facilities or personnel (e.g., regional office or biologist).

   2. The second section is to be filled out **and signed** by the person responsible for the collections while being stored at DEC, before delivery to the analytical lab. This may be the same person as in (1), but it is still required that they complete the section. Also important is the **range of identification numbers** (i.e., tag numbers) included in the sample batch.

   3. Finally, the bottom box is to record any transfers between DEC personnel and facilities. Each subsequent transfer should be **identified, signed, and dated**, until laboratory personnel take possession of the fish.

B. The following data are required on each **Fish Collection Record** form:

   1. Project and Site Name.

   2. DEC Region.

   3. All personnel (and affiliation) involved in the collection.

   4. Method of collection (gill net, hook and line, etc.)

   5. Preservation Method.

C. The following data are to be taken on each fish collected and recorded on the **Fish Collection Record** form:

   1. Tag number - Each specimen is to be individually jaw tagged at time of collection with a unique number. Make sure the tag is turned out so that the number can be read without opening the bag. Use tags in sequential order. For small fish or composite samples place the tag inside the bag with the samples. The Bureau of Ecosystem Health can supply the tags.

   2. Species identification (please be explicit enough to enable assigning genus and species). Group fish by species when processing.

   3. Date collected.

   4. Sample location (waterway and nearest prominent identifiable landmark).

   5. Total length (nearest mm or smallest sub-unit on measuring instrument) and weight (nearest g or

smallest sub-unit of weight on weighing instrument). Take all measures as soon as possible with calibrated, protected instruments (e.g. from wind and upsets) and prior to freezing.

6. Sex - fish may be cut enough to allow sexing or other internal investigation, but do not eviscerate. Make any incision on the right side of the belly flap or exactly down the midline so that a left-side fillet can be removed.

D. General data collection recommendations:

1. It is helpful to use an ID or tag number that will be unique. It is best to use metal striped bass or other uniquely numbered metal tags. If uniquely numbered tags are unavailable, values based on the region, water body and year are likely to be unique: for example, R7CAY11001 for Region 7, Cayuga Lake, 2011, fish 1. If the fish are just numbered 1 through 20, we have to give them new numbers for our database, making it more difficult to trace your fish to their analytical results and creating an additional possibility for errors.

2. Process and record fish of the same species sequentially. Recording mistakes are less likely when all fish from a species are processed together. Starting with the bigger fish species helps avoid missing an individual.

3. If using Bureau of Ecosystem Health supplied tags or other numbered tags, use tags in sequence so that fish are recorded with sequential Tag Numbers. This makes data entry and login at the lab and use of the data in the future easier and reduces keypunch errors.

4. Record length and weight as soon as possible after collection and before freezing. Other data are recorded in the field upon collection. An age determination of each fish is optional, but if done, it is recorded in the appropriate “Age” column.

5. For composite samples of small fish, record the number of fish in the composite in the Remarks column. Record the length and weight of each individual in a composite. All fish in a composite sample should be of the same species and members of a composite should be visually matched for size.

6. Please submit photocopies of topographic maps or good quality navigation charts indicating sampling locations. GPS coordinates can be entered in the Location column of the collection record form in addition to or instead for providing a map. These records are of immense help to us (and hopefully you) in providing documented location records which are not dependent on memory and/or the same collection crew. In addition, they may be helpful for contaminant source trackdown and remediation/control efforts of the Department.

7. When recording data on fish measurements, it will help to ensure correct data recording for the data recorder to call back the numbers to the person making the measurements.

E. Each fish is to be placed in its own individual plastic bag. For small fish to be analyzed as a composite, put all of the fish for one composite in the same bag but use a separate bag for each composite. It is important to individually bag the fish to avoid difficulties or cross contamination when processing the fish for chemical analysis. Be sure to include the fish’s tag number inside the bag, preferably attached to the fish with the tag number turned out so it can be read. Tie or otherwise secure the bag closed. **The Bureau of Ecosystem Health will supply the bags.** If necessary, food grade bags may be procured from a suitable vendor (e.g., grocery store). It is preferable to redundantly label each bag with a manila tag tied between the knot and the body of the bag. This tag should be labeled with the project name, collection location, tag number, collection date, and fish species. If scales are collected, the scale envelope should be labeled with

the same information.

F. Groups of fish, by species, are to be placed in one large plastic bag per sampling location. **The Bureau of Ecosystem Health will supply the larger bags.** Tie or otherwise secure the bag closed. Label the site bag with a manila tag tied between the knot and the body of the bag. The tag should contain: project, collection location, collection date, species and **tag number ranges**. Having this information on the manila tag enables lab staff to know what is in the bag without opening it.

G. Do not eviscerate, fillet or otherwise dissect the fish unless specifically asked to. If evisceration or dissection is specified, the fish must be cut along the exact midline or on the right side so that the left side fillet can be removed intact at the laboratory. If filleting is specified, the procedure for taking a standard fillet (SOP PREPLAB 4) must be followed, including removing scales.

H. Special procedures for PFAS: Unlike legacy contaminants such as PCBs, which are rarely found in day to day life, PFAS are widely used and frequently encountered. Practices that avoid sample contamination are therefore necessary. While no standard practices have been established for fish, procedures for water quality sampling can provide guidance. The following practices should be used for collections when fish are to be analyzed for PFAS:

No materials containing Teflon.
No Post-it notes.
No ice packs; only water ice or dry ice.
Any gloves worn must be powder free nitrile.
No Gore-Tex or similar materials (Gore-Tex is a PFC with PFOA used in its manufacture).
No stain repellent or waterproof treated clothing; these are likely to contain PFCs.
Avoid plastic materials, other than HDPE, including clipboards and waterproof notebooks.
Wash hands after handling any food containers or packages as these may contain PFCs.
Keep pre-wrapped food containers and wrappers isolated from fish handling.
Wear clothing washed at least six times since purchase.
Wear clothing washed without fabric softener.
Staff should avoid cosmetics, moisturizers, hand creams and similar products on the day of sampling as many of these products contain PFCs (Fujii et al. 2013). Sunscreen or insect repellent should not contain ingredients with “fluor” in their name. Apply any sunscreen or insect repellent well downwind from all materials. Hands must be washed after touching any of these products.

I. All fish must be kept at a temperature <45° F (<8° C) immediately following data processing. As soon as possible, freeze at -20° C ± 5° C. Due to occasional freezer failures, daily freezer temperature logs are required. The freezer should be locked or otherwise secured to maintain chain of custody.

J. In most cases, samples should be delivered to the Analytical Services Unit at the Hale Creek field station. Coordinate delivery with field station staff and send copies of the collection records, continuity of evidence forms and freezer temperature logs to the field station. For samples to be analyzed elsewhere, non-routine collections or other questions, contact Wayne Richter, Bureau of Ecosystem Health, NYSDEC, 625 Broadway, Albany, New York 12233-4756, 518-402-8974, or the project leader about sample transfer. Samples will then be directed to the analytical facility and personnel noted on specific project descriptions.

K. A recommended equipment list is at the end of this document.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF FISH AND WILDLIFE
FISH COLLECTION RECORD

Project and Site Name _____ DEC Region _____

Collections made by (include all crew) _____

Sampling Method: □Electrofishing □Gill netting □Trap netting □Trawling □Seining □Angling □Other _____

Preservation Method: □Freezing □Other _____ Notes (SWFDB survey number): _____

FOR LAB USE ONLY- LAB ENTRY NO.	COLLECTION OR TAG NO.	SPECIES	DATE TAKEN	LOCATION	AGE	SEX &/OR REPROD. CONDIT	LENGTH ( )	WEIGHT ( )	REMARKS

richter: revised 2011, 5/7/15, 10/4/16, 3/20/17; becker: 3/23/17, 4/26/19

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
CHAIN OF CUSTODY

I, _____, of _____ collected the
(Print Name) (Print Business Address)

following on _____, 20____ from _____
(Date) (Water Body)

in the vicinity of _____
(Landmark, Village, Road, etc.)

Town of _____, in _____ County.

Item(s) _____

_____

Said sample(s) were in my possession and handled according to standard procedures provided to me prior to collection. The sample(s) were placed in the custody of a representative of the New York State Department of Environmental Conservation on _____, 20_____.

_____ _____
Signature Date

I, _____, received the above mentioned sample(s) on the date specified and assigned identification number(s) _____ to the sample(s). I have recorded pertinent data for the sample(s) on the attached collection records. The sample(s) remained in my custody until subsequently transferred, prepared or shipped at times and on dates as attested to below.

_____ _____
Signature Date

SECOND RECIPIENT (Print Name)	TIME & DATE	PURPOSE OF TRANSFER
SIGNATURE	UNIT	
THIRD RECIPIENT (Print Name)	TIME & DATE	PURPOSE OF TRANSFER
SIGNATURE	UNIT	
FOURTH RECIPIENT (Print Name)	TIME & DATE	PURPOSE OF TRANSFER
SIGNATURE	UNIT	
RECEIVED IN LABORATORY BY (Print Name)	TIME & DATE	REMARKS
SIGNATURE	UNIT	
LOGGED IN BY (Print Name)	TIME & DATE	ACCESSION NUMBERS
SIGNATURE	UNIT	

richter: revised 21 April 2014; becker: 23 March 2017, 26 April, 2019

NOTICE OF WARRANTY

By signature to the chain of custody (reverse), the signatory warrants that the information provided is truthful and accurate to the best of his/her ability. The signatory affirms that he/she is willing to testify to those facts provided and the circumstances surrounding the same. Nothing in this warranty or chain of custody negates responsibility nor liability of the signatories for the truthfulness and accuracy of the statements provided.

HANDLING INSTRUCTIONS

On day of collection, collector(s) name(s), address(es), date, geographic location of capture (attach a copy of topographic map or navigation chart), species, number kept of each species, and description of capture vicinity (proper noun, if possible) along with name of Town and County must be indicated on reverse.

Retain organisms in manila tagged plastic bags to avoid mixing capture locations. Note appropriate information on each bag tag.

Keep samples as cool as possible. Put on ice if fish cannot be frozen within 12 hours. If fish are held more than 24 hours without freezing, they will not be retained or analyzed.

Initial recipient (either DEC or designated agent) of samples from collector(s) is responsible for obtaining and recording information on the collection record forms which will accompany the chain of custody. This person will seal the container using packing tape and writing his signature, the time and the date across the tape onto the container with indelible marker. Any time a seal is broken, for whatever purpose, the incident must be recorded on the Chain of Custody (reason, time, and date) in the purpose of transfer block. Container then is resealed using new tape and rewriting signature, with time and date.

EQUIPMENT LIST

Scale or balance of appropriate capacity for the fish to be collected.

Fish measuring board.

Plastic bags of an appropriate size for the fish to be collected and for site bags.

Individually numbered metal tags for fish.

Manila tags to label bags.

Small envelops, approximately 2” x 3.5”, if fish scales are to be collected.

Knife for removing scales.

Chain of custody and fish collection forms.

Clipboard.

Pens or markers.

Paper towels.

Dish soap and brush.

Bucket.

Cooler.

Ice.

Duct tape.

Appendix G – PFAS Analyte List

Group	Chemical Name	Abbreviation	CAS Number
Perfluoroalkyl sulfonic acids	Perfluorobutanesulfonic acid	PFBS	375-73-5
	Perfluoropentanesulfonic acid	PFPeS	2706-91-4
	Perfluorohexanesulfonic acid	PFHxS	355-46-4
	Perfluoroheptanesulfonic acid	PFHpS	375-92-8
	Perfluorooctanesulfonic acid	PFOS	1763-23-1
	Perfluorononanesulfonic acid	PFNS	68259-12-1
	Perfluorodecanesulfonic acid	PFDS	335-77-3
	Perfluorododecanesulfonic acid	PFDoS	79780-39-5
Perfluoroalkyl carboxylic acids	Perfluorobutanoic acid	PFBA	375-22-4
	Perfluoropentanoic acid	PFPeA	2706-90-3
	Perfluorohexanoic acid	PFHxA	307-24-4
	Perfluoroheptanoic acid	PFHpA	375-85-9
	Perfluorooctanoic acid	PFOA	335-67-1
	Perfluorononanoic acid	PFNA	375-95-1
	Perfluorodecanoic acid	PFDA	335-76-2
	Perfluoroundecanoic acid	PFUnA	2058-94-8
	Perfluorododecanoic acid	PFDoA	307-55-1
	Perfluorotridecanoic acid	PFTrDA	72629-94-8
	Perfluorotetradecanoic acid	PFTeDA	376-06-7
Per- and Polyfluoroether carboxylic acids	Hexafluoropropylene oxide dimer acid	HFPO-DA	13252-13-6
	4,8-Dioxa-3H-perfluorononanoic acid	ADONA	919005-14-4
	Perfluoro-3-methoxypropanoic acid	PFMPA	377-73-1
	Perfluoro-4-methoxybutanoic acid	PFMBA	863090-89-5
	Nonafluoro-3,6-dioxaheptanoic acid	NFDHA	151772-58-6
Fluorotelomer sulfonic acids	4:2 Fluorotelomer sulfonic acid	4:2-FTS	757124-72-4
	6:2 Fluorotelomer sulfonic acid	6:2-FTS	27619-97-2
	8:2 Fluorotelomer sulfonic acid	8:2-FTS	39108-34-4
Fluorotelomer carboxylic acids	3:3 Fluorotelomer carboxylic acid	3:3 FTCA	356-02-5
	5:3 Fluorotelomer carboxylic acid	5:3 FTCA	914637-49-3
	7:3 Fluorotelomer carboxylic acid	7:3 FTCA	812-70-4
Perfluorooctane sulfonamides	Perfluorooctane sulfonamide	PFOSA	754-91-6
	N-methylperfluorooctane sulfonamide	NMeFOSA	31506-32-8
	N-ethylperfluorooctane sulfonamide	NEtFOSA	4151-50-2
Perfluorooctane sulfonamidoacetic acids	N-methylperfluorooctane sulfonamidoacetic acid	N-MeFOSAA	2355-31-9
	N-ethylperfluorooctane sulfonamidoacetic acid	N-EtFOSAA	2991-50-6
Perfluorooctane sulfonamide ethanols	N-methylperfluorooctane sulfonamidoethanol	MeFOSE	24448-09-7
	N-ethylperfluorooctane sulfonamidoethanol	EtFOSE	1691-99-2

Group	Chemical Name	Abbreviation	CAS Number
Ether sulfonic acids	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (F-53B Major)	9Cl-PF3ONS	756426-58-1
	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (F-53B Minor)	11Cl-PF3OUdS	763051-92-9
	Perfluoro(2-ethoxyethane) sulfonic acid	PFEESA	113507-82-7

Appendix H - Data Review Guidelines for Analysis of PFAS in Non-Potable Water and Solids

General

These guidelines are intended to be used for the validation of PFAS using EPA Method 1633 for projects within the Division of Environmental Remediation (DER). Data reviewers should understand the methodology and techniques utilized in the analysis. Consultation with the end user of the data may be necessary to assist in determining data usability based on the data quality objectives in the Quality Assurance Project Plan. A familiarity with the laboratory's Standard Operating Procedure may also be needed to fully evaluate the data. If you have any questions, please contact DER's Quality Assurance Officer, Dana Barbarossa, at dana.barbarossa@dec.ny.gov.

Preservation and Holding Time

Samples should be preserved with ice to a temperature of less than 6°C upon arrival at the lab. The holding time is 28 days to extraction for aqueous and solid samples. The time from extraction to analysis for aqueous samples is 28 days and 40 days for solids.

Temperature greatly exceeds 6ºC upon arrival at the lab*	Use professional judgement to qualify detects and non-detects as estimated or rejected
Holding time exceeding 28 days to extraction	Use professional judgement to qualify detects and non-detects as estimated or rejected if holding time is grossly exceeded

*Samples that are delivered to the lab immediately after sampling may not meet the thermal preservation guidelines. Samples are considered acceptable if they arrive on ice or an attempt to chill the samples is observed.

Initial Calibration

The initial calibration should contain a minimum of six standards for linear fit and six standards for a quadratic fit. The relative standard deviation (RSD) for a quadratic fit calibration should be less than 20%.

The low-level calibration standard should be within 50% - 150% of the true value, and the mid-level calibration standard within 70% - 130% of the true value.

%RSD >20%	J flag detects and UJ non detects

Continuing Calibration Verification

Continuing calibration verification (CCV) checks should be analyzed at a frequency of one per ten field samples. If CCV recovery is very low, where detection of the analyte could be in question, ensure a low level CCV was analyzed and use to determine data quality.

CCV recovery <70 or >130%	J flag results

Blanks

There should be no detections in the method blanks above the reporting limits. Equipment blanks, field blanks, rinse blanks etc. should be evaluated in the same manner as method blanks. Use the most contaminated blank to evaluate the sample results.

Blank Result	Sample Result	Qualification
Any detection	<Reporting limit	Qualify as ND at reporting limit
Any detection	>Reporting Limit and >10x the blank result	No qualification
>Reporting limit	>Reporting limit and <10x blank result	J+ biased high

Field Duplicates

A blind field duplicate should be collected at rate of one per twenty samples. The relative percent difference (RPD) should be less than 30% for analyte concentrations greater than two times the reporting limit. Use the higher result for final reporting.

RPD >30%	Apply J qualifier to parent sample

Lab Control Spike

Lab control spikes should be analyzed with each extraction batch or one for every twenty samples. In the absence of lab derived criteria, use 70% - 130% recovery criteria to evaluate the data.

Recovery <70% or >130% (lab derived criteria can also be used)	Apply J qualifier to detects and UJ qualifier to non detects

Matrix Spike/Matrix Spike Duplicate

One matrix spike and matrix spike duplicate should be collected at a rate of one per twenty samples. Use professional judgement to reject results based on out of control MS/MSD recoveries.

Recovery <70% or >130% (lab derived criteria can also be used)	Apply J qualifier to detects and UJ qualifier to non detects of parent sample only
RPD >30%	Apply J qualifier to detects and UJ qualifier to non detects of parent sample only

Extracted Internal Standards (Isotope Dilution Analytes)

Problematic analytes (e.g. PFBA, PFPeA, fluorotelomer sulfonates) can have wider recoveries without qualification. Qualify corresponding native compounds with a J flag if outside of the range.

Recovery <50% or >150%	Apply J qualifier
Recovery <25% or >150% for poor responding analytes	Apply J qualifier
Isotope Dilution Analyte (IDA) Recovery <10%	Reject results

Signal to Noise Ratio

The signal to noise ratio for the quantifier ion should be at least 3:1. If the ratio is less than 3:1, the peak is discernable from the baseline noise and symmetrical, the result can be reported. If the peak appears to be baseline noise and/or the shape is irregular, qualify the result as tentatively identified.

Reporting Limits

If project-specific reporting limits were not met, please indicate that in the report along with the reason (e.g. over dilution, dilution for non-target analytes, high sediment in aqueous samples).

Peak Integrations

Target analyte peaks should be integrated properly and consistently when compared to standards. Ensure branched isomer peaks are included for PFAS where standards are available. Inconsistencies should be brought to the attention of the laboratory or identified in the data review summary report.

ATTACHMENT E

Data Usability Summary Report

LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES

Technical Memorandum

1 University Square Drive Princeton, NJ 08540 T: 609.282.8000
Mailing Address: 1 University Square Drive Princeton, NJ 08540

To: Elizabeth Burgess, Langan Senior Project Engineer

From: Joe Conboy, Langan Project Chemist

Date: February 25, 2026

Re: Data Usability Summary Report
For Willets Point Development – L Parcel
January 2026 Groundwater Samples
Langan Project No.: 170197605

This memorandum presents the findings of an analytical data validation from the analysis of groundwater samples collected in January 2026 by Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C at the Willets Point Development – L Parcel site. The samples were analyzed by ALS USA Environmental - Stratford, CT (NYSDOH NELAP registration # 10854) for volatile organic compounds (VOCs) by the methods specified below.

- VOCs by SW-846 Method 8260D

Table 1, attached, summarizes the laboratory and client sample identification numbers, sample collection dates, level of data validation, and analytical parameters subject to review.

Validation Overview

This data validation was performed in accordance with the following guidelines, where applicable:

- USEPA Region II Standard Operating Procedures (SOPs) for Data Validation
- USEPA Contract Laboratory Program "National Functional Guidelines for Organic Superfund Methods Data Review" (EPA 540- R-20-005, November 2020)
- USEPA Contract Laboratory Program "National Functional Guidelines for Inorganic Superfund Methods Data Review" (EPA 540- R-20-005, November 2020), and
- published analytical methodologies.

The following acronyms may be used in the discussion of data-quality issues:

%D	Percent Difference	MB	Method Blank
CCV	Continuing Calibration Verification	MDL	Method Detection Limit
FB	Field Blank	MS	Matrix Spike
FD	Field Duplicate	MSD	Matrix Spike Duplicate
ICAL	Initial Calibration	RF	Response Factor
ICV	Initial Calibration Verification	RL	Reporting Limit
ISTD	Internal Standard	RPD	Relative Percent Difference
LCL	Lower Control Limit	RSD	Relative Standard Deviation
LCS	Laboratory Control Sample	TB	Trip Blank
LCSD	Laboratory Control Sample Duplicate	UCL	Upper Control Limit

Tier 1 data validation is based on completeness and compliance checks of sample-related QC results including: sample receipt documentation; analytical holding times; sample preservation; blank results (method, field, and trip); surrogate recoveries; MS/MSD recoveries and RPDs values; field duplicate RPDs, laboratory duplicate RPDs, and LCS/LCSD recoveries and RPDs. All sample delivery groups underwent Tier 1 validation review.

As a result of the review process, the following qualifiers may be assigned to the data in accordance with the USEPA guidelines and our best professional judgment:

- **R –** The sample results are unusable. The results are rejected because of serious deficiencies in meeting quality control criteria in accordance with the applicable validation guidelines. The analyte may or may not be present in the sample.
- **J –** The analyte was positively identified above the quantitation limit, and the associated numerical value is the approximate concentration of the analyte in the sample.
- **UJ –** The analyte was not detected at or above the quantitation limit. The reported quantitation limit may be imprecise because of potential low or indeterminate bias.
- **U –** The analyte was not detected at or above the quantitation limit, or the analyte detection is impacted by blank contamination and qualified as non-detect in accordance with the applicable validation guidelines.

If any validation qualifiers are assigned, these qualifiers should supersede any laboratory-applied qualifiers. Data that is not qualified because of this data validation is considered acceptable based on the items specified for review. Data that is qualified as "R" are considered invalid and are not technically usable for data interpretation. Data that is otherwise qualified because of minor data-quality anomalies are usable, as qualified in Table 2 (attached).

MAJOR DEFICIENCIES:

Major deficiencies include those that grossly impact data quality and necessitate the rejection of results. No major deficiencies were identified.

MINOR DEFICIENCIES:

Minor deficiencies include anomalies that directly impact data quality and necessitate qualification, but do not result in unusable data. The section below describes the minor deficiencies that were identified.

VOCs by SW-846 Method 8260D

26A1279

The MB for batch BB60345 exhibited a detection of 1,2,4-trimethylbenzene (0.32 ug/L), acetone (1.38 ug/L), hexachlorobutadiene (0.27 ug/L), o-xylene (1,2-dimethylbenzene) (0.42 ug/L), m,p-xylene (0.79 ug/L), toluene (0.81 ug/L), and xylenes (1.21 ug/L). The associated detected results <10x the blank concentration in samples TMW01_012926, TMW02_012926, TMW03_012926, TMW04_012926, and GWDUP01_012926 are qualified as J because of potential blank contamination.

The LCS/LCSD for batch BB60345 exhibited percent recoveries below the LCL for 2-hexanone (43.3%, 44%), bromomethane (28.6%, 28.8%), methyl ethyl ketone (2-butanone) (47.4%, 47%), methyl isobutyl ketone (4-methyl-2-pentanone) (44.6%, 45.2%), tert-butyl methyl ether (51%, 46.7%), and tetrachloroethene (55.6%, 54.7%). The associated results in samples TMW01_012926, TMW02_012926, TMW03_012926, TMW04_012926, and GWDUP01_012926 are qualified as J or UJ because of potential low bias.

The LCS for batch BB60345 exhibited a percent recovery above the UCL for toluene (135%). The associated results in samples TMW01_012926, TMW02_012926, TMW03_012926, TMW04_012926, and GWDUP01_012926 are qualified as J because of potential high bias.

The LCS/LCSD for batch BB60464 exhibited a percent recovery below the LCL for tert-butyl methyl ether (48.6%, 48.2%). The associated dilution results in samples TMW01_012926, TMW03_012926, TMW04_012926, and GWDUP01_012926 are qualified as J because of potential low bias.

OTHER DEFICIENCIES:

Other deficiencies include anomalies that do not directly impact data quality and do not necessitate qualification. No other deficiencies were identified.

FIELD DUPLICATE:

One field duplicate and parent sample pair was collected and analyzed for all parameters. For results less than 5X the RL, analytes meet the precision criteria if the absolute difference is less than ±1X the RL. For results greater than 5X the RL, analytes meet the precision criteria if the RPD is less than or equal to 30% for soil/groundwater. The following field duplicate and parent sample pair was compared to the precision criteria:

- GWDUP01_012926 and TMW03_012926

The field duplicate and parent sample (GWDUP01_012926 and TMW03_012926) exhibited absolute differences above the RL for acrylonitrile (9.3 ug/L), methyl ethyl ketone (2-butanone) (0.64 ug/L), and styrene (1.06 ug/L). The associated results are qualified as J or UJ because of potential indeterminate bias.

CONCLUSION:

Based on this evaluation, the laboratory appears to have followed the specified analytical methods except for errors discussed above. If a given fraction is not mentioned above, that means that all specified criteria were met for that parameter. All the data packages met ASP Category B requirements.

All data are considered usable, as qualified. In addition, completeness, defined as the percentage of analytical results that are judged to be valid, is 100%.

Signed:

Joe Conboy
Project Chemist

ATTACHMENT F

Baseline Groundwater and Soil Analytical Data Summary

Attachment F
Treatability Study Report
Baseline Soil Analytical Data Summary

Willets Point Development L-Parcel
Queens, New York
NYSDEC BCP Site No.: C241146H
Langan Project No.: 170197605

Analyte	CAS Number	NYSDEC Part 375 Protection of Groundwater SCOs	Location	TS01	TS02	TS03
			Sample Name	TS01_EL_4-6	TS02_EL_1-3	TS03_EL_1-3
			Sample Date	01/29/2026	01/29/2026	01/29/2026
			Sample Depth	4-6	1-3	1-3
			Unit	Result	Result	Result
Volatile Organic Compounds						
1,1,1,2-Tetrachloroethane	630-20-6	NS	mg/kg	<0.0056 U	<0.0073 U	<0.0063 U
1,1,1-Trichloroethane	71-55-6	0.68	mg/kg	<0.0056 U	<0.0073 U	<0.0063 U
1,1,2,2-Tetrachloroethane	79-34-5	NS	mg/kg	<0.0056 U	<0.0073 U	<0.0063 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	NS	mg/kg	<0.0056 U	<0.0073 U	<0.0063 U
1,1,2-Trichloroethane	79-00-5	NS	mg/kg	<0.0056 U	<0.0073 U	<0.0063 U
1,1-Dichloroethane	75-34-3	0.27	mg/kg	0.0044 J	<0.0073 U	<0.0063 U
1,1-Dichloroethene	75-35-4	0.33	mg/kg	<0.0056 U	<0.0073 U	<0.0063 U
1,2,3-Trichlorobenzene	87-61-6	NS	mg/kg	<0.0056 U	<0.0073 U	<0.0063 U
1,2,3-Trichloropropane	96-18-4	NS	mg/kg	<0.0056 U	<0.0073 U	<0.0063 U
1,2,4-Trichlorobenzene	120-82-1	NS	mg/kg	<0.0056 U	<0.0073 U	<0.0063 U
1,2,4-Trimethylbenzene	95-63-6	**5.9**	mg/kg	**360 D**	**35 D**	**140 D**
1,2-Dibromo-3-Chloropropane	96-12-8	NS	mg/kg	<0.0056 U	<0.0073 U	<0.0063 U
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	NS	mg/kg	<0.0056 U	<0.0073 U	<0.0063 U
1,2-Dichlorobenzene	95-50-1	1.1	mg/kg	<0.0056 U	<0.0073 U	<0.0063 U
1,2-Dichloroethane	107-06-2	0.02	mg/kg	<0.0056 U	<0.0073 U	<0.0063 U
1,2-Dichloropropane	78-87-5	NS	mg/kg	<0.0056 U	<0.0073 U	<0.0063 U
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	**3.1**	mg/kg	**80 D**	**13 D**	**39 D**
1,3-Dichlorobenzene	541-73-1	2.6	mg/kg	<0.0056 U	<0.0073 U	<0.0063 U
1,4-Dichlorobenzene	106-46-7	1.8	mg/kg	<0.0056 U	<0.0073 U	<0.0063 U
2-Hexanone (MBK)	591-78-6	NS	mg/kg	<0.0056 U	0.14	<0.0063 U
Acetone	67-64-1	**0.03**	mg/kg	**0.14**	**0.32**	**0.13**
Acrolein	107-02-8	NS	mg/kg	<0.011 U	<0.015 U	<0.013 U
Acrylonitrile	107-13-1	NS	mg/kg	<0.0056 U	<0.0073 U	<0.0063 U
Benzene	71-43-2	**0.06**	mg/kg	**8.2 D**	**0.1**	**7.5 D**
Bromochloromethane	74-97-5	NS	mg/kg	<0.0056 U	<0.0073 U	<0.0063 U
Bromodichloromethane	75-27-4	NS	mg/kg	<0.0056 U	<0.0073 U	<0.0063 U
Bromoform	75-25-2	NS	mg/kg	<0.0056 U	<0.0073 U	<0.0063 U
Bromomethane	74-83-9	NS	mg/kg	<0.0056 U	<0.0073 U	<0.0063 U
Carbon Disulfide	75-15-0	NS	mg/kg	<0.0056 U	<0.0073 U	0.011
Carbon Tetrachloride	56-23-5	0.76	mg/kg	<0.0056 U	<0.0073 U	<0.0063 U
Chlorobenzene	108-90-7	4.5	mg/kg	<0.0056 U	<0.0073 U	<0.0063 U
Chloroethane	75-00-3	NS	mg/kg	<0.0056 U	<0.0073 U	<0.0063 U
Chloroform	67-66-3	0.37	mg/kg	<0.0056 U	<0.0073 U	<0.0063 U
Chloromethane	74-87-3	NS	mg/kg	0.0039 J	<0.0073 U	<0.0063 U
Cis-1,2-Dichloroethene	156-59-2	0.19	mg/kg	0.032	<0.0073 U	<0.0063 U
Cis-1,3-Dichloropropene	10061-01-5	NS	mg/kg	<0.0056 U	<0.0073 U	<0.0063 U
Cyclohexane	110-82-7	NS	mg/kg	13 D	0.069	13 D
Cymene	99-87-6	NS	mg/kg	0.059	<0.0073 U	0.026
Dibromochloromethane	124-48-1	NS	mg/kg	<0.0056 U	<0.0073 U	<0.0063 U
Dibromomethane	74-95-3	NS	mg/kg	<0.0056 U	<0.0073 U	<0.0063 U
Dichlorodifluoromethane	75-71-8	NS	mg/kg	<0.0056 U	<0.0073 U	<0.0063 U
Ethylbenzene	100-41-4	**1**	mg/kg	**25 D**	**9 D**	**36 D**
Hexachlorobutadiene	87-68-3	NS	mg/kg	<0.0056 U	<0.0073 U	<0.0063 U
Isopropylbenzene (Cumene)	98-82-8	NS	mg/kg	0.27	0.11	0.12
M,P-Xylene	179601-23-1	NS	mg/kg	110 D	30 D	170 D
Methyl Acetate	79-20-9	NS	mg/kg	<0.0056 U	<0.0073 U	<0.0063 U
Methyl Ethyl Ketone (2-Butanone)	78-93-3	0.1	mg/kg	0.023	<0.0073 U	<0.0063 U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	108-10-1	NS	mg/kg	<0.0056 U	0.52	<0.0063 U
Methylcyclohexane	108-87-2	NS	mg/kg	5.1 D	0.064	0.43
Methylene Chloride	75-09-2	0.05	mg/kg	<0.011 U	<0.015 U	<0.013 U
n-Butylbenzene	104-51-8	**18**	mg/kg	**25 D**	0.078	0.055
n-Propylbenzene	103-65-1	**5**	mg/kg	**33 D**	0.21	0.32
o-Xylene (1,2-Dimethylbenzene)	95-47-6	NS	mg/kg	53 D	16 D	70 D
Sec-Butylbenzene	135-98-8	25	mg/kg	0.12	<0.0073 U	0.035
Styrene	100-42-5	NS	mg/kg	0.26	<0.0073 U	0.14
T-Butylbenzene	98-06-6	11	mg/kg	<0.0056 U	<0.0073 U	<0.0063 U
Tert-Butyl Alcohol	75-65-0	NS	mg/kg	<0.028 U	<0.036 U	<0.032 U
Tert-Butyl Methyl Ether (MTBE)	1634-04-4	**0.1**	mg/kg	**2.6 D**	<0.0073 U	<0.0063 U
Tetrachloroethene (PCE)	127-18-4	1.3	mg/kg	<0.0056 U	<0.0073 U	<0.0063 U
Toluene	108-88-3	**0.7**	mg/kg	**46 D**	**9.5 D**	**75 D**
Total Xylenes	1330-20-7	**1.2**	mg/kg	**170 D**	**46 D**	**240 D**
Trans-1,2-Dichloroethene	156-60-5	0.19	mg/kg	<0.0056 U	<0.0073 U	<0.0063 U
Trans-1,3-Dichloropropene	10061-02-6	NS	mg/kg	<0.0056 U	<0.0073 U	<0.0063 U
Trichloroethene (TCE)	79-01-6	0.47	mg/kg	<0.0056 U	<0.0073 U	<0.0063 U
Trichlorofluoromethane	75-69-4	NS	mg/kg	<0.0056 U	<0.0073 U	<0.0063 U
Vinyl Chloride	75-01-4	0.03	mg/kg	<0.0056 U	<0.0073 U	<0.0063 U

Attachment F
Treatability Study Report
Baseline Soil Analytical Data Summary

Willets Point Development L-Parcel
Queens, New York
NYSDEC BCP Site No.: C241146H
Langan Project No.: 170197605

Analyte	CAS Number	NYSDEC Part 375 Protection of Groundwater SCOs	Location	TS01	TS02	TS03
			Sample Name	TS01_EL_4-6	TS02_EL_1-3	TS03_EL_1-3
			Sample Date	01/29/2026	01/29/2026	01/29/2026
			Sample Depth	4-6	1-3	1-3
			Unit	Result	Result	Result
Semi-Volatile Organic Compounds						
1,2,4,5-Tetrachlorobenzene	95-94-3	NS	mg/kg	<0.185 U	<0.194 U	<0.203 U
1,2-Diphenylhydrazine	122-66-7	NS	mg/kg	<0.0928 U	<0.0971 U	<0.102 U
2,3,4,6-Tetrachlorophenol	58-90-2	NS	mg/kg	<0.185 U	<0.194 U	<0.203 U
2,4,5-Trichlorophenol	95-95-4	NS	mg/kg	<0.0928 U	<0.0971 U	<0.102 U
2,4,6-Trichlorophenol	88-06-2	NS	mg/kg	<0.0928 U	<0.0971 U	<0.102 U
2,4-Dichlorophenol	120-83-2	NS	mg/kg	<0.0928 U	<0.0971 U	<0.102 U
2,4-Dimethylphenol	105-67-9	NS	mg/kg	<0.0928 U	<0.0971 U	<0.102 U
2,4-Dinitrophenol	51-28-5	NS	mg/kg	<0.185 U	<0.194 U	<0.203 U
2,4-Dinitrotoluene	121-14-2	NS	mg/kg	<0.0928 U	<0.0971 U	<0.102 U
2,6-Dinitrotoluene	606-20-2	NS	mg/kg	<0.0928 U	<0.0971 U	<0.102 U
2-Chloronaphthalene	91-58-7	NS	mg/kg	<0.0928 U	<0.0971 U	<0.102 U
2-Chlorophenol	95-57-8	NS	mg/kg	<0.0928 U	<0.0971 U	<0.102 U
2-Methylnaphthalene	91-57-6	NS	mg/kg	<0.0928 U	3.26 D	1.35 D
2-Methylphenol (o-Cresol)	95-48-7	0.33	mg/kg	<0.0928 U	<0.0971 U	<0.102 U
2-Nitroaniline	88-74-4	NS	mg/kg	<0.185 U	<0.194 U	<0.203 U
2-Nitrophenol	88-75-5	NS	mg/kg	<0.0928 U	<0.0971 U	<0.102 U
3 & 4 Methylphenol (m&p Cresol)	65794-96-9	0.33	mg/kg	<0.0928 U	<0.0971 U	<0.102 U
3,3'-Dichlorobenzidine	91-94-1	NS	mg/kg	<0.0928 U	<0.0971 U	<0.102 U
3-Nitroaniline	99-09-2	NS	mg/kg	<0.185 U	<0.194 U	<0.203 U
4,6-Dinitro-2-Methylphenol	534-52-1	NS	mg/kg	<0.185 U	<0.194 U	<0.203 U
4-Bromophenyl Phenyl Ether	101-55-3	NS	mg/kg	<0.0928 U	<0.0971 U	<0.102 U
4-Chloro-3-Methylphenol	59-50-7	NS	mg/kg	<0.0928 U	<0.0971 U	<0.102 U
4-Chloroaniline	106-47-8	NS	mg/kg	<0.0928 U	<0.0971 U	<0.102 U
4-Chlorophenyl Phenyl Ether	7005-72-3	NS	mg/kg	<0.0928 U	<0.0971 U	<0.102 U
4-Nitroaniline	100-01-6	NS	mg/kg	<0.185 U	<0.194 U	<0.203 U
4-Nitrophenol	100-02-7	NS	mg/kg	<0.185 U	<0.194 U	<0.203 U
Acenaphthene	83-32-9	98	mg/kg	<0.0928 U	2.05 D	0.082 JD
Acenaphthylene	208-96-8	365	mg/kg	<0.0928 U	0.168 D	<0.102 U
Acetophenone	98-86-2	NS	mg/kg	<0.0928 U	<0.0971 U	<0.102 U
Aniline (Phenylamine, Aminobenzene)	62-53-3	0.04	mg/kg	<0.372 U	<0.389 U	<0.407 U
Anthracene	120-12-7	1000	mg/kg	<0.0928 U	1.97 D	0.201 D
Atrazine	1912-24-9	NS	mg/kg	<0.0928 U	<0.0971 U	<0.102 U
Benzaldehyde	100-52-7	NS	mg/kg	<0.0928 U	<0.0971 U	<0.102 U
Benzidine	92-87-5	NS	mg/kg	<0.372 U	<0.389 U	<0.407 U
Benzo(a)anthracene	56-55-3	**1**	mg/kg	0.0964 D	**4.01 D**	0.4 D
Benzo(a)pyrene	50-32-8	22	mg/kg	0.142 D	3.45 D	0.334 D
Benzo(b)fluoranthene	205-99-2	**2.1**	mg/kg	0.106 D	**3.26 D**	0.318 D
Benzo(g,h,i)Perylene	191-24-2	1000	mg/kg	0.0823 JD	2.87 D	0.197 D
Benzo(k)fluoranthene	207-08-9	**2**	mg/kg	0.0979 D	**2.72 D**	0.266 D
Benzoic Acid	65-85-0	NS	mg/kg	<0.0928 U	<0.0971 U	<0.102 U
Benzyl Alcohol	100-51-6	NS	mg/kg	<0.0928 U	<0.0971 U	<0.102 U
Benzyl Butyl Phthalate	85-68-7	NS	mg/kg	<0.0928 U	0.811 D	0.642 D
Biphenyl (Diphenyl)	92-52-4	NS	mg/kg	<0.0928 U	<0.0971 U	<0.102 U
Bis(2-chloroethoxy) methane	111-91-1	NS	mg/kg	<0.0928 U	<0.0971 U	<0.102 U
Bis(2-chloroethyl) ether (2-chloroethyl ether)	111-44-4	NS	mg/kg	<0.0928 U	<0.0971 U	<0.102 U
Bis(2-chloroisopropyl) ether	108-60-1	NS	mg/kg	<0.0928 U	<0.0971 U	<0.102 U
Bis(2-ethylhexyl) phthalate	117-81-7	NS	mg/kg	<0.0928 U	6.6 D	3.24 D
Caprolactam	105-60-2	NS	mg/kg	<0.185 U	<0.194 U	<0.203 U
Carbazole	86-74-8	NS	mg/kg	<0.0928 U	1.17 D	0.056 JD
Chrysene	218-01-9	**1**	mg/kg	0.0942 D	**3.51 D**	0.395 D
Dibenz(a,h)anthracene	53-70-3	1000	mg/kg	<0.0928 U	1.11 D	<0.102 U
Dibenzofuran	132-64-9	110	mg/kg	<0.0928 U	<0.0971 U	<0.102 U
Dibutyl phthalate	84-74-2	NS	mg/kg	<0.0928 U	0.184 D	0.0983 JD
Diethyl phthalate	84-66-2	NS	mg/kg	<0.0928 U	<0.0971 U	<0.102 U
Dimethyl phthalate	131-11-3	NS	mg/kg	<0.0928 U	<0.0971 U	<0.102 U
Dioctyl phthalate	117-84-0	NS	mg/kg	<0.0928 U	1.51 D	0.18 D
Diphenylamine	122-39-4	NS	mg/kg	<0.185 U	<0.194 U	<0.203 U
Fluoranthene	206-44-0	1000	mg/kg	0.128 D	7.54 D	0.974 D
Fluorene	86-73-7	386	mg/kg	<0.0928 U	2.32 D	0.127 D
Hexachlorobenzene	118-74-1	3.2	mg/kg	<0.0928 U	<0.0971 U	<0.102 U
Hexachlorobutadiene	87-68-3	NS	mg/kg	<0.0928 U	<0.0971 U	<0.102 U
Hexachlorocyclopentadiene	77-47-4	NS	mg/kg	<0.0928 U	<0.0971 U	<0.102 U
Hexachloroethane	67-72-1	NS	mg/kg	<0.0928 U	<0.0971 U	<0.102 U
Indeno(1,2,3-cd)pyrene	193-39-5	6.6	mg/kg	0.0875 JD	2.06 D	0.193 D
Isophorone	78-59-1	NS	mg/kg	<0.0928 U	<0.0971 U	<0.102 U
Naphthalene	91-20-3	12	mg/kg	<0.0928 U	3.21 D	1.06 D
Nitrobenzene	98-95-3	0.08	mg/kg	<0.0928 U	<0.0971 U	<0.102 U
n-Nitrosodimethylamine	62-75-9	NS	mg/kg	<0.0928 U	<0.0971 U	<0.102 U
n-Nitrosodi-N-Propylamine	621-64-7	NS	mg/kg	<0.0928 U	<0.0971 U	<0.102 U
n-Nitrosodiphenylamine	86-30-6	NS	mg/kg	<0.0928 U	<0.0971 U	<0.102 U
Pentachlorophenol	87-86-5	0.8	mg/kg	<0.0928 U	<0.0971 U	<0.102 U
Phenanthrene	85-01-8	1000	mg/kg	0.0586 JD	7.44 D	0.665 D
Phenol	108-95-2	0.33	mg/kg	<0.0928 U	<0.0971 U	<0.102 U
Pyrene	129-00-0	1000	mg/kg	0.111 D	7.24 D	0.835 D
Pyridine	110-86-1	NS	mg/kg	<0.372 U	<0.389 U	<0.407 U
General Chemistry						
Solids, Percent	SOLID	NS	Percent	89.6	85.6	81.8

Willets Point Development L-Parcel
Queens, New York
NYSDEC BCP Site No.: C241146H
Langan Project No.: 170197605

Notes:

CAS - Chemical Abstract Service
NS - No standard
mg/kg - milligram per kilogram
NA - Not analyzed
RL - Reporting limit
<RL - Not detected

Soil sample analytical results are compared to the New York State Department of Environmental Conservation (NYSDEC) Title 6 of the Official Compilation of New York Codes, Rules, and Regulations (NYCRR) Part 375 Protection of Groundwater Soil Cleanup Objectives (SCO) (December 2025).

Criterion comparisons for 3- & 4-methylphenol (m&p cresol) are provided for reference. Promulgated SCOs are for 3-methylphenol (m-cresol) and 4-methylphenol (p-cresol).

Qualifiers:

D - The concentration reported is a result of a diluted sample.

J - The analyte was detected above the method detection limit (MDL), but below the RL; therefore, the result is an estimated concentration.

U - The analyte was analyzed for, but was not detected at a level greater than or equal to the RL; the value shown in the table is the RL.

Exceedance Summary:

10 - Result exceeds Protection of Groundwater SCOs

Attachment F
Treatability Study Report
Baseline Groundwater Analytical Data Summary

Willets Point Development L-Parcel
Queens, New York
NYSDEC BCP Site No.: C241146H
Langan Project No.: 170197605

Analyte	CAS Number	NYSDEC SGVs	Location	J-MW118
			Sample Name	J-MW118_013026
			Sample Date	01/30/2026
			Unit	Result
Volatile Organic Compounds				
1,1,1,2-Tetrachloroethane	630-20-6	5	ug/l	<0.5 U
1,1,1-Trichloroethane	71-55-6	5	ug/l	<0.5 U
1,1,2,2-Tetrachloroethane	79-34-5	5	ug/l	<0.5 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	5	ug/l	<0.5 U
1,1,2-Trichloroethane	79-00-5	1	ug/l	<0.5 U
1,1-Dichloroethane	75-34-3	5	ug/l	<0.5 U
1,1-Dichloroethene	75-35-4	5	ug/l	<0.5 U
1,2,3-Trichlorobenzene	87-61-6	5	ug/l	<0.5 U
1,2,3-Trichloropropane	96-18-4	0.04	ug/l	<0.5 U
1,2,4-Trichlorobenzene	120-82-1	5	ug/l	<0.5 U
1,2,4-Trimethylbenzene	95-63-6	**5**	ug/l	**221 D**
1,2-Dibromo-3-Chloropropane	96-12-8	0.04	ug/l	<0.5 U
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	0.0006	ug/l	<0.5 U
1,2-Dichlorobenzene	95-50-1	**3**	ug/l	**3.6**
1,2-Dichloroethane	107-06-2	0.6	ug/l	<0.5 U
1,2-Dichloropropane	78-87-5	1	ug/l	<0.5 U
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	**5**	ug/l	**76.7**
1,3-Dichlorobenzene	541-73-1	3	ug/l	<0.5 U
1,4-Dichlorobenzene	106-46-7	3	ug/l	<0.5 U
2-Hexanone (MBK)	591-78-6	50	ug/l	<0.5 U
Acetone	67-64-1	50	ug/l	32.2
Acrolein	107-02-8	5	ug/l	<0.5 U
Acrylonitrile	107-13-1	5	ug/l	<0.5 U
Benzene	71-43-2	**1**	ug/l	**98.5 D**
Bromochloromethane	74-97-5	5	ug/l	<0.5 U
Bromodichloromethane	75-27-4	50	ug/l	<0.5 U
Bromoform	75-25-2	50	ug/l	<0.5 U
Bromomethane	74-83-9	5	ug/l	<2 U
Carbon Disulfide	75-15-0	60	ug/l	4.16
Carbon Tetrachloride	56-23-5	5	ug/l	<0.5 U
Chlorobenzene	108-90-7	5	ug/l	<0.5 U
Chloroethane	75-00-3	5	ug/l	<0.5 U
Chloroform	67-66-3	7	ug/l	<0.5 U
Chloromethane	74-87-3	5	ug/l	<0.5 U
Cis-1,2-Dichloroethene	156-59-2	5	ug/l	0.31 J
Cis-1,3-Dichloropropene	10061-01-5	0.4	ug/l	<0.5 U
Cyclohexane	110-82-7	NS	ug/l	14.5
Cymene	99-87-6	5	ug/l	1.71
Dibromochloromethane	124-48-1	50	ug/l	<0.5 U
Dibromomethane	74-95-3	5	ug/l	<0.5 U
Dichlorodifluoromethane	75-71-8	5	ug/l	<0.5 U
Ethylbenzene	100-41-4	**5**	ug/l	**154 D**
Hexachlorobutadiene	87-68-3	0.5	ug/l	<0.5 U
Isopropylbenzene (Cumene)	98-82-8	**5**	ug/l	**14.6**
M,P-Xylene	179601-23-1	**5**	ug/l	**599 D**
Methyl Acetate	79-20-9	NS	ug/l	<0.5 U
Methyl Ethyl Ketone (2-Butanone)	78-93-3	50	ug/l	4.69
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	108-10-1	NS	ug/l	18.9
Methylcyclohexane	108-87-2	NS	ug/l	7.99
Methylene Chloride	75-09-2	5	ug/l	<2 U
n-Butylbenzene	104-51-8	5	ug/l	<0.5 U
n-Propylbenzene	103-65-1	**5**	ug/l	**31.7**
o-Xylene (1,2-Dimethylbenzene)	95-47-6	**5**	ug/l	**296 D**
Sec-Butylbenzene	135-98-8	5	ug/l	2.6
Styrene	100-42-5	5	ug/l	<0.5 U
T-Butylbenzene	98-06-6	5	ug/l	<0.5 U
Tert-Butyl Alcohol	75-65-0	NS	ug/l	587 D
Tert-Butyl Methyl Ether (MTBE)	1634-04-4	**10**	ug/l	**478 D**
Tetrachloroethene (PCE)	127-18-4	5	ug/l	<0.5 U
Toluene	108-88-3	**5**	ug/l	**370 D**
Total Xylenes	1330-20-7	**5**	ug/l	**895 D**
Trans-1,2-Dichloroethene	156-60-5	5	ug/l	<0.5 U
Trans-1,3-Dichloropropene	10061-02-6	0.4	ug/l	<0.5 U
Trichloroethene (TCE)	79-01-6	5	ug/l	0.37 J
Trichlorofluoromethane	75-69-4	5	ug/l	<0.5 U
Vinyl Chloride	75-01-4	2	ug/l	<0.5 U

Attachment F
Treatability Study Report
Baseline Groundwater Analytical Data Summary

Willets Point Development L-Parcel
Queens, New York
NYSDEC BCP Site No.: C241146H
Langan Project No.: 170197605

Analyte	CAS Number	NYSDEC SGVs	Location	J-MW118
			Sample Name	J-MW118_013026
			Sample Date	01/30/2026
			Unit	Result
Semi-Volatile Organic Compounds				
1,2,4,5-Tetrachlorobenzene	95-94-3	5	ug/l	<5 U
1,2-Diphenylhydrazine	122-66-7	0	ug/l	<5 U
2,3,4,6-Tetrachlorophenol	58-90-2	NS	ug/l	<5 U
2,4,5-Trichlorophenol	95-95-4	NS	ug/l	<5 U
2,4,6-Trichlorophenol	88-06-2	NS	ug/l	<5 U
2,4-Dichlorophenol	120-83-2	1	ug/l	<5 U
2,4-Dimethylphenol	105-67-9	1	ug/l	<5 U
2,4-Dinitrophenol	51-28-5	1	ug/l	<5 U
2,4-Dinitrotoluene	121-14-2	5	ug/l	<5 U
2,6-Dinitrotoluene	606-20-2	5	ug/l	<5 U
2-Chloronaphthalene	91-58-7	10	ug/l	<5 U
2-Chlorophenol	95-57-8	NS	ug/l	<5 U
2-Methylnaphthalene	91-57-6	NS	ug/l	12.1
2-Methylphenol (o-Cresol)	95-48-7	NS	ug/l	<5 U
2-Nitroaniline	88-74-4	5	ug/l	<5 U
2-Nitrophenol	88-75-5	NS	ug/l	<5 U
3 & 4 Methylphenol (m&p Cresol)	65794-96-9	NS	ug/l	<5 U
3,3'-Dichlorobenzidine	91-94-1	5	ug/l	<5 U
3-Nitroaniline	99-09-2	5	ug/l	<5 U
4,6-Dinitro-2-Methylphenol	534-52-1	NS	ug/l	<5 U
4-Bromophenyl Phenyl Ether	101-55-3	NS	ug/l	<5 U
4-Chloro-3-Methylphenol	59-50-7	NS	ug/l	<5 U
4-Chloroaniline	106-47-8	5	ug/l	<5 U
4-Chlorophenyl Phenyl Ether	7005-72-3	NS	ug/l	<5 U
4-Nitroaniline	100-01-6	5	ug/l	<5 U
4-Nitrophenol	100-02-7	NS	ug/l	<5 U
Acenaphthene	83-32-9	20	ug/l	<0.05 U
Acenaphthylene	208-96-8	NS	ug/l	<0.05 U
Acetophenone	98-86-2	NS	ug/l	<5 U
Aniline (Phenylamine, Aminobenzene)	62-53-3	5	ug/l	<5 U
Anthracene	120-12-7	50	ug/l	<0.05 U
Atrazine	1912-24-9	7.5	ug/l	<0.5 U
Benzaldehyde	100-52-7	NS	ug/l	<5 U
Benzidine	92-87-5	5	ug/l	<5 U
Benzo(a)anthracene	56-55-3	0.002	ug/l	<0.05 U
Benzo(a)pyrene	50-32-8	0	ug/l	<0.05 U
Benzo(b)fluoranthene	205-99-2	0.002	ug/l	<0.05 U
Benzo(g,h,i)Perylene	191-24-2	NS	ug/l	<0.05 U
Benzo(k)fluoranthene	207-08-9	0.002	ug/l	<0.05 U
Benzoic Acid	65-85-0	NS	ug/l	<5 U
Benzyl Alcohol	100-51-6	NS	ug/l	<5 U
Benzyl Butyl Phthalate	85-68-7	50	ug/l	<5 U
Biphenyl (Diphenyl)	92-52-4	5	ug/l	<5 U
Bis(2-chloroethoxy) methane	111-91-1	5	ug/l	<5 U
Bis(2-chloroethyl) ether (2-chloroethyl ether)	111-44-4	1	ug/l	<5 U
Bis(2-chloroisopropyl) ether	108-60-1	5	ug/l	<5 U
Bis(2-ethylhexyl) phthalate	117-81-7	5	ug/l	<0.5 U
Caprolactam	105-60-2	NS	ug/l	<5 U
Carbazole	86-74-8	NS	ug/l	<5 U
Chrysene	218-01-9	0.002	ug/l	<0.05 U
Dibenz(a,h)anthracene	53-70-3	NS	ug/l	<0.05 U
Dibenzofuran	132-64-9	NS	ug/l	<5 U
Dibutyl phthalate	84-74-2	50	ug/l	<5 U
Diethyl phthalate	84-66-2	50	ug/l	<5 U
Dimethyl phthalate	131-11-3	50	ug/l	<5 U
Dioctyl phthalate	117-84-0	50	ug/l	<5 U
Diphenylamine	122-39-4	5	ug/l	<5 U
Fluoranthene	206-44-0	50	ug/l	<0.05 U
Fluorene	86-73-7	50	ug/l	<0.05 U
Hexachlorobenzene	118-74-1	0.04	ug/l	<0.02 U
Hexachlorobutadiene	87-68-3	0.5	ug/l	<0.5 U
Hexachlorocyclopentadiene	77-47-4	5	ug/l	<10 U
Hexachloroethane	67-72-1	5	ug/l	<0.5 U
Indeno(1,2,3-cd)pyrene	193-39-5	0.002	ug/l	<0.05 U
Isophorone	78-59-1	50	ug/l	<5 U
Naphthalene	91-20-3	10	ug/l	3.3
Nitrobenzene	98-95-3	0.4	ug/l	<0.25 U
n-Nitrosodimethylamine	62-75-9	NS	ug/l	<0.5 U
n-Nitrosodi-N-Propylamine	621-64-7	NS	ug/l	<5 U
n-Nitrosodiphenylamine	86-30-6	50	ug/l	<5 U
Pentachlorophenol	87-86-5	1	ug/l	<0.25 U
Phenanthrene	85-01-8	50	ug/l	<0.05 U
Phenol	108-95-2	1	ug/l	<5 U
Pyrene	129-00-0	50	ug/l	<0.05 U
Pyridine	110-86-1	50	ug/l	<5 U
General Chemistry				
Total Organic Carbon	TOC	NS	ug/l	62,100

Willets Point Development L-Parcel
Queens, New York
NYSDEC BCP Site No.: C241146H
Langan Project No.: 170197605

Notes:

CAS - Chemical Abstract Service
NS - No standard
ug/l - microgram per liter
NA - Not analyzed
RL - Reporting limit
<RL - Not detected

Groundwater sample analytical results are compared to the New York State Department of Environmental Conservation (NYSDEC) Title 6 Codes, Rules, and Regulations (NYCRR) Part 703.5 and the NYSDEC Technical and Operation Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards and Guidance Values for Class GA Water and published addenda (herein collectively referenced as "NYSDEC SGVs").

Qualifiers:

D - The concentration reported is a result of a diluted sample.
J - The analyte was detected above the method detection limit (MDL), but below the RL; therefore, the result is an estimated concentration.
U - The analyte was analyzed for, but was not detected at a level greater than or equal to the RL; the value shown in the table is the RL.

Exceedance Summary:

10 - Result exceeds NYSDEC SGVs

ATTACHMENT G

Laboratory Analytical Reports

Technical Report

prepared for:

Langan Engineering & Environmental Services (NYC)
21 Penn Plaza, 360 West 31st Street
New York NY, 10001
Attention: Amita Oka

Report Date: 03/12/2026
Client Project ID: 170197605
Project (SDG) No.: 26C0140

Report Date: 03/12/2026
Client Project ID: 170197605
Project (SDG) No.: 26C0140

Langan Engineering & Environmental Services (NYC)
21 Penn Plaza, 360 West 31st Street
New York NY, 10001
Attention: Amita Oka

Purpose and Results

This report contains the analytical data for the sample(s) identified on the attached chain-of-custody received in our laboratory on March 03, 2026 and listed below. The project was identified as your project: **170197605**.

The analyses were conducted utilizing appropriate EPA, Standard Methods, and ASTM methods as detailed in the data summary tables.

All samples were received in proper condition meeting the customary acceptance requirements for environmental samples except those indicated under the Sample and Analysis Qualifiers section of this report.

All analyses met the method and laboratory standard operating procedure requirements except as indicated by any data flags, the meaning of which are explained in the Sample and Data Qualifiers Relating to This Work Order section of this report and case narrative if applicable.

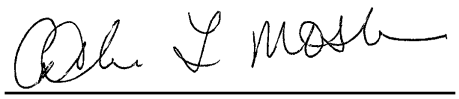
The results of the analyses, which are all reported on dry weight basis (soils) unless otherwise noted, are detailed in the following pages.

Please contact Client Services at 203.325.1371 with any questions regarding this report.

Sample ID	Client Sample ID	Matrix	Date Collected	Date Received
26C0140-01	TS-01-GW-E1	Ground Water	03/03/2026	03/03/2026
26C0140-02	TS-01-GW-E2	Ground Water	03/03/2026	03/03/2026
26C0140-03	TS-01-GW-E3	Ground Water	03/03/2026	03/03/2026
26C0140-04	TS-01-GW-E4	Ground Water	03/03/2026	03/03/2026
26C0140-05	TS-01-GW-E5	Ground Water	03/03/2026	03/03/2026
26C0140-06	TS-01-GW-E6	Ground Water	03/03/2026	03/03/2026
26C0140-07	TS-01-S-E1	Soil	03/03/2026	03/03/2026
26C0140-08	TS-01-S-E2	Soil	03/03/2026	03/03/2026
26C0140-09	TS-01-S-E3	Soil	03/03/2026	03/03/2026
26C0140-10	TS-01-S-E4	Soil	03/03/2026	03/03/2026
26C0140-11	TS-01-S-E5	Soil	03/03/2026	03/03/2026
26C0140-12	TS-01-S-E6	Soil	03/03/2026	03/03/2026

General Notes for Project (SDG) No.: 26C0140

1. The RLs and MDLs (Reporting Limit and Method Detection Limit respectively) reported are adjusted for any dilution necessary due to the levels of target and/or non-target analytes and matrix interference. The RL(REPORTING LIMIT) is based upon the lowest standard utilized for the calibration where applicable.
2. Samples are retained for a period of thirty days after submittal of report, unless other arrangements are made.
3. ALS' liability for the above data is limited to the dollar value paid to ALS for the referenced project.
4. This report shall not be reproduced without the written approval of ALS, Inc.
5. All analyses conducted met method or Laboratory SOP requirements. See the Sample and Data Qualifiers Section for further information.
6. It is noted that no analyses reported herein were subcontracted to another laboratory, unless noted in the report.
7. This report reflects results that relate only to the samples submitted on the attached chain-of-custody form(s) received by ALS.
8. Analyses conducted at ALS, Inc. Stratford, CT are indicated by NY Cert. No. 10854; those conducted at ALS, Inc., Richmond Hill, NY are indicated by NY Cert. No. 12058.

Approved By: 

Date: 03/12/2026

Cassie Mosher
Laboratory Manager - Stratford

Positive Hits Included in This Report

Parameter	Result	Flag	MDL	RL	Units	Specific Method	Analyzed
26C0140-01 - TS-01-GW-E1							
1,2,4-Trimethylbenzene	225		3.10	5.00	ug/L	EPA 8260D	03/04/26 12:53
1,3,5-Trimethylbenzene	56.3		3.47	5.00	ug/L	EPA 8260D	03/04/26 12:53
2-Butanone	77.5	CCVE, ICVE, QL-02	4.21	5.00	ug/L	EPA 8260D	03/04/26 12:53
4-Methyl-2-pentanone	72.5	CCVE, ICVE, QL-02	3.65	5.00	ug/L	EPA 8260D	03/04/26 12:53
Acetone	361	CAL-E	33.5	50.0	ug/L	EPA 8260D	03/06/26 2:12
Benzene	598		2.79	5.00	ug/L	EPA 8260D	03/04/26 12:53
Ethyl Benzene	31.9		2.90	5.00	ug/L	EPA 8260D	03/04/26 12:53
Isopropylbenzene	5.40		4.05	5.00	ug/L	EPA 8260D	03/04/26 12:53
Methyl tert-butyl ether (MTBE)	365		2.44	5.00	ug/L	EPA 8260D	03/04/26 12:53
Methylene chloride	25.1		3.97	20.0	ug/L	EPA 8260D	03/04/26 12:53
n-Propylbenzene	13.6		3.84	5.00	ug/L	EPA 8260D	03/04/26 12:53
o-Xylene	122		2.61	5.00	ug/L	EPA 8260D	03/04/26 12:53
p- & m- Xylenes	141		5.78	10.0	ug/L	EPA 8260D	03/04/26 12:53
Styrene	12.6		2.55	5.00	ug/L	EPA 8260D	03/04/26 12:53
Toluene	95.3		3.46	5.00	ug/L	EPA 8260D	03/04/26 12:53
Xylenes, Total	263		8.39	15.0	ug/L	EPA 8260D	03/04/26 12:53
2-Methylnaphthalene	16.8		2.50	5.00	ug/L	EPA 8270E	03/05/26 22:00
2-Methylphenol	8.74		2.50	5.00	ug/L	EPA 8270E	03/05/26 22:00
* 3- & 4-Methylphenols	37.4		2.50	5.00	ug/L	EPA 8270E	03/05/26 22:00
Benzoic acid	33.4	QL-02	2.50	5.00	ug/L	EPA 8270E	03/05/26 22:00
Benzyl alcohol	11.9		2.50	5.00	ug/L	EPA 8270E	03/05/26 22:00
Phenol	27.3		0.750	5.00	ug/L	EPA 8270E	03/05/26 22:00
Acenaphthene	4.00		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 15:17
Acenaphthylene	0.290		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 15:17
* Anthracene	3.36		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 15:17
Benzo(a)anthracene	1.06		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 15:17
Benzo(a)pyrene	0.497		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 15:17
Benzo(b)fluoranthene	0.421		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 15:17
Benzo(g,h,i)perylene	0.266		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 15:17
Benzo(k)fluoranthene	0.483		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 15:17
* Bis(2-ethylhexyl)phthalate	1.36		0.500	0.500	ug/L	EPA 8270E SIM	03/06/26 15:17
Chrysene	0.680		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 15:17
Dibenzo(a,h)anthracene	0.119		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 15:17
Fluoranthene	2.60		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 15:17
Fluorene	2.88		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 15:17
Indeno(1,2,3-cd)pyrene	0.237		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 15:17
Naphthalene	70.3		1.00	1.00	ug/L	EPA 8270E SIM	03/09/26 16:27
Phenanthrene	5.72		1.00	1.00	ug/L	EPA 8270E SIM	03/09/26 16:27
Pyrene	2.18		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 15:17
Total Organic Carbon (TOC)	1150		50.0	50.0	mg/L	SM 5310B-2014	03/09/26 9:37
26C0140-02 - TS-01-GW-E2							

26C0140-02 - TS-01-GW-E2							
1,2,4-Trimethylbenzene	215		3.10	5.00	ug/L	EPA 8260D	03/04/26 13:22
1,3,5-Trimethylbenzene	54.7		3.47	5.00	ug/L	EPA 8260D	03/04/26 13:22
2-Butanone	70.9	CCVE, ICVE, QL-02	4.21	5.00	ug/L	EPA 8260D	03/04/26 13:22
4-Methyl-2-pentanone	84.2	CCVE, ICVE, QL-02	3.65	5.00	ug/L	EPA 8260D	03/04/26 13:22
Acetone	326	CAL-E	33.5	50.0	ug/L	EPA 8260D	03/06/26 2:42
Benzene	558		2.79	5.00	ug/L	EPA 8260D	03/04/26 13:22
Ethyl Benzene	31.7		2.90	5.00	ug/L	EPA 8260D	03/04/26 13:22
Isopropylbenzene	5.30		4.05	5.00	ug/L	EPA 8260D	03/04/26 13:22
Methyl tert-butyl ether (MTBE)	387		2.44	5.00	ug/L	EPA 8260D	03/04/26 13:22
Methylene chloride	13.2		3.97	20.0	ug/L	EPA 8260D	03/04/26 13:22
n-Propylbenzene	13.2		3.84	5.00	ug/L	EPA 8260D	03/04/26 13:22
o-Xylene	117		2.61	5.00	ug/L	EPA 8260D	03/04/26 13:22
p- & m- Xylenes	141		5.78	10.0	ug/L	EPA 8260D	03/04/26 13:22
Styrene	12.8		2.55	5.00	ug/L	EPA 8260D	03/04/26 13:22
Toluene	102		3.46	5.00	ug/L	EPA 8260D	03/04/26 13:22
Xylenes, Total	258		8.39	15.0	ug/L	EPA 8260D	03/04/26 13:22
2,4-Dimethylphenol	18.9		2.50	5.00	ug/L	EPA 8270E	03/05/26 22:36
2-Methylnaphthalene	20.4		2.50	5.00	ug/L	EPA 8270E	03/05/26 22:36
2-Methylphenol	8.34		2.50	5.00	ug/L	EPA 8270E	03/05/26 22:36
* 3- & 4-Methylphenols	36.9		2.50	5.00	ug/L	EPA 8270E	03/05/26 22:36
Benzoic acid	38.8	QL-02	2.50	5.00	ug/L	EPA 8270E	03/05/26 22:36
Benzyl alcohol	13.0		2.50	5.00	ug/L	EPA 8270E	03/05/26 22:36
Carbazole	9.46		2.50	5.00	ug/L	EPA 8270E	03/05/26 22:36
Phenol	28.0		0.750	5.00	ug/L	EPA 8270E	03/05/26 22:36
Acenaphthene	4.76		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 15:47
Acenaphthylene	0.303		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 15:47
* Anthracene	3.68		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 15:47
Benzo(a)anthracene	1.17		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 15:47
Benzo(a)pyrene	0.547		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 15:47
Benzo(b)fluoranthene	0.691		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 15:47
Benzo(g,h,i)perylene	0.295		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 15:47
Benzo(k)fluoranthene	0.676		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 15:47
* Bis(2-ethylhexyl)phthalate	1.53		0.500	0.500	ug/L	EPA 8270E SIM	03/06/26 15:47
Chrysene	0.766		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 15:47
Dibenzo(a,h)anthracene	0.129		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 15:47
Fluoranthene	2.84		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 15:47
Fluorene	3.51		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 15:47
Indeno(1,2,3-cd)pyrene	0.261		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 15:47
Naphthalene	82.3		5.00	5.00	ug/L	EPA 8270E SIM	03/10/26 13:33
* Pentachlorophenol	0.868		0.250	0.250	ug/L	EPA 8270E SIM	03/06/26 15:47
Phenanthrene	8.69		0.500	0.500	ug/L	EPA 8270E SIM	03/09/26 16:58
Pyrene	2.57		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 15:47
Total Organic Carbon (TOC)	9330		50.0	50.0	mg/L	SM 5310B-2014	03/09/26 9:37
26C0140-03 - TS-01-GW-E3							
1,2,4-Trimethylbenzene	186		3.10	5.00	ug/L	EPA 8260D	03/04/26 13:52
1,3,5-Trimethylbenzene	48.5		3.47	5.00	ug/L	EPA 8260D	03/04/26 13:52
2-Butanone	56.0	CCVE, ICVE, QL-02	4.21	5.00	ug/L	EPA 8260D	03/04/26 13:52

26C0140-03 - TS-01-GW-E3							
4-Methyl-2-pentanone	76.3	CCVE, ICVE, QL-02	3.65	5.00	ug/L	EPA 8260D	03/04/26 13:52
Acetone	232	CAL-E	33.5	50.0	ug/L	EPA 8260D	03/06/26 3:12
Benzene	760		2.79	5.00	ug/L	EPA 8260D	03/04/26 13:52
Ethyl Benzene	29.2		2.90	5.00	ug/L	EPA 8260D	03/04/26 13:52
Isopropylbenzene	4.40		4.05	5.00	ug/L	EPA 8260D	03/04/26 13:52
Methyl tert-butyl ether (MTBE)	403		2.44	5.00	ug/L	EPA 8260D	03/04/26 13:52
Methylene chloride	12.5		3.97	20.0	ug/L	EPA 8260D	03/04/26 13:52
n-Propylbenzene	11.1		3.84	5.00	ug/L	EPA 8260D	03/04/26 13:52
o-Xylene	110		2.61	5.00	ug/L	EPA 8260D	03/04/26 13:52
p- & m- Xylenes	131		5.78	10.0	ug/L	EPA 8260D	03/04/26 13:52
Styrene	10.9		2.55	5.00	ug/L	EPA 8260D	03/04/26 13:52
Toluene	114		3.46	5.00	ug/L	EPA 8260D	03/04/26 13:52
Xylenes, Total	242		8.39	15.0	ug/L	EPA 8260D	03/04/26 13:52
2,4-Dimethylphenol	26.3		2.50	5.00	ug/L	EPA 8270E	03/05/26 23:11
2-Methylnaphthalene	26.5		2.50	5.00	ug/L	EPA 8270E	03/05/26 23:11
2-Methylphenol	10.6		2.50	5.00	ug/L	EPA 8270E	03/05/26 23:11
* 3- & 4-Methylphenols	36.4		2.50	5.00	ug/L	EPA 8270E	03/05/26 23:11
Benzoic acid	33.8	QL-02	2.50	5.00	ug/L	EPA 8270E	03/05/26 23:11
Benzyl alcohol	12.5		2.50	5.00	ug/L	EPA 8270E	03/05/26 23:11
Carbazole	7.55		2.50	5.00	ug/L	EPA 8270E	03/05/26 23:11
Phenol	24.4		0.750	5.00	ug/L	EPA 8270E	03/05/26 23:11
Acenaphthene	3.51		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 16:18
Acenaphthylene	0.486		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 16:18
* Anthracene	3.06		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 16:18
Benzo(a)anthracene	1.72		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 16:18
Benzo(a)pyrene	1.20		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 16:18
Benzo(b)fluoranthene	1.21		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 16:18
Benzo(g,h,i)perylene	0.640		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 16:18
Benzo(k)fluoranthene	1.23		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 16:18
* Bis(2-ethylhexyl)phthalate	3.59		0.500	0.500	ug/L	EPA 8270E SIM	03/06/26 16:18
Chrysene	1.53		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 16:18
Dibenzo(a,h)anthracene	0.276		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 16:18
Fluoranthene	4.72		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 16:18
Fluorene	3.23		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 16:18
Indeno(1,2,3-cd)pyrene	0.574		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 16:18
Naphthalene	166		5.00	5.00	ug/L	EPA 8270E SIM	03/09/26 17:29
Phenanthrene	7.85		5.00	5.00	ug/L	EPA 8270E SIM	03/09/26 17:29
Pyrene	4.04		0.0500	0.0500	ug/L	EPA 8270E SIM	03/06/26 16:18
Total Organic Carbon (TOC)	8950		50.0	50.0	mg/L	SM 5310B-2014	03/09/26 9:37
26C0140-04 - TS-01-GW-E4							
1,2,4-Trimethylbenzene	18.8		1.55	2.50	ug/L	EPA 8260D	03/04/26 11:25
1,3,5-Trimethylbenzene	4.90		1.74	2.50	ug/L	EPA 8260D	03/04/26 11:25
2-Butanone	72.3	CCVE, ICVE, QL-02	2.10	2.50	ug/L	EPA 8260D	03/04/26 11:25
4-Methyl-2-pentanone	17.2	CCVE, ICVE, QL-02	1.82	2.50	ug/L	EPA 8260D	03/04/26 11:25
Acetone	606	CAL-E	33.5	50.0	ug/L	EPA 8260D	03/06/26 0:43
Benzene	25.2		1.40	2.50	ug/L	EPA 8260D	03/04/26 11:25
Carbon disulfide	2.95		1.81	2.50	ug/L	EPA 8260D	03/04/26 11:25

26C0140-04 - TS-01-GW-E4							
Ethyl Benzene	2.40		1.45	2.50	ug/L	EPA 8260D	03/04/26 11:25
Methyl tert-butyl ether (MTBE)	24.4		1.22	2.50	ug/L	EPA 8260D	03/04/26 11:25
Methylene chloride	4.35		1.98	10.0	ug/L	EPA 8260D	03/04/26 11:25
o-Xylene	9.00		1.30	2.50	ug/L	EPA 8260D	03/04/26 11:25
p- & m- Xylenes	11.0		2.89	5.00	ug/L	EPA 8260D	03/04/26 11:25
Toluene	7.95		1.73	2.50	ug/L	EPA 8260D	03/04/26 11:25
Xylenes, Total	20.0		4.20	7.50	ug/L	EPA 8260D	03/04/26 11:25
2-Methylnaphthalene	4.98	J	2.50	5.00	ug/L	EPA 8270E	03/05/26 2:32
Benzoic acid	94.4		25.0	50.0	ug/L	EPA 8270E	03/05/26 10:49
Acenaphthene	0.876		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 12:25
Acenaphthylene	0.243		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 12:25
* Anthracene	0.682		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 12:25
Benzo(a)anthracene	1.43		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 12:25
Benzo(a)pyrene	0.685		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 12:25
Benzo(b)fluoranthene	0.928		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 12:25
Benzo(g,h,i)perylene	0.551		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 12:25
Benzo(k)fluoranthene	0.932		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 12:25
* Bis(2-ethylhexyl)phthalate	2.65	CCVE	0.500	0.500	ug/L	EPA 8270E SIM	03/05/26 12:25
Chrysene	1.45		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 12:25
Dibenzo(a,h)anthracene	0.139		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 12:25
Fluoranthene	4.49		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 12:25
Fluorene	1.26		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 12:25
Indeno(1,2,3-cd)pyrene	0.496		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 12:25
Naphthalene	37.6		0.500	0.500	ug/L	EPA 8270E SIM	03/09/26 18:00
Phenanthrene	5.61		0.500	0.500	ug/L	EPA 8270E SIM	03/09/26 18:00
Pyrene	2.85		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 12:25
Total Organic Carbon (TOC)	8790		50.0	50.0	mg/L	SM 5310B-2014	03/09/26 9:37
26C0140-05 - TS-01-GW-E5							
1,2,4-Trimethylbenzene	16.8		1.55	2.50	ug/L	EPA 8260D	03/04/26 11:54
1,3,5-Trimethylbenzene	3.85		1.74	2.50	ug/L	EPA 8260D	03/04/26 11:54
2-Butanone	85.9	CCVE, ICVE, QL-02	2.10	2.50	ug/L	EPA 8260D	03/04/26 11:54
2-Hexanone	5.30	CCVE, ICVE, QL-02	1.60	2.50	ug/L	EPA 8260D	03/04/26 11:54
4-Methyl-2-pentanone	15.9	CCVE, ICVE, QL-02	1.82	2.50	ug/L	EPA 8260D	03/04/26 11:54
Acetone	608	CAL-E	33.5	50.0	ug/L	EPA 8260D	03/06/26 1:13
Benzene	26.4		1.40	2.50	ug/L	EPA 8260D	03/04/26 11:54
Ethyl Benzene	1.80		1.45	2.50	ug/L	EPA 8260D	03/04/26 11:54
Methyl tert-butyl ether (MTBE)	26.6		1.22	2.50	ug/L	EPA 8260D	03/04/26 11:54
Methylene chloride	6.70		1.98	10.0	ug/L	EPA 8260D	03/04/26 11:54
o-Xylene	7.65		1.30	2.50	ug/L	EPA 8260D	03/04/26 11:54
p- & m- Xylenes	9.25		2.89	5.00	ug/L	EPA 8260D	03/04/26 11:54
Toluene	6.10		1.73	2.50	ug/L	EPA 8260D	03/04/26 11:54
Xylenes, Total	16.9		4.20	7.50	ug/L	EPA 8260D	03/04/26 11:54
2-Methylnaphthalene	6.81		2.50	5.00	ug/L	EPA 8270E	03/05/26 3:07
Benzoic acid	85.5		12.5	25.0	ug/L	EPA 8270E	03/05/26 11:23
Acenaphthene	0.860		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 12:55
Acenaphthylene	0.243		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 12:55
* Anthracene	0.633		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 12:55

26C0140-05 - TS-01-GW-E5							
Benzo(a)anthracene	1.49		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 12:55
Benzo(a)pyrene	0.652		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 12:55
Benzo(b)fluoranthene	0.900		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 12:55
Benzo(g,h,i)perylene	0.624		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 12:55
Benzo(k)fluoranthene	0.923		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 12:55
* Bis(2-ethylhexyl)phthalate	1.95	CCVE	0.500	0.500	ug/L	EPA 8270E SIM	03/05/26 12:55
Chrysene	1.43		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 12:55
Dibenzo(a,h)anthracene	0.135		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 12:55
Fluoranthene	3.05		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 12:55
Fluorene	1.22		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 12:55
Indeno(1,2,3-cd)pyrene	0.528		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 12:55
Naphthalene	41.7		0.500	0.500	ug/L	EPA 8270E SIM	03/09/26 18:30
Phenanthrene	5.85		0.500	0.500	ug/L	EPA 8270E SIM	03/09/26 18:30
Pyrene	1.97		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 12:55
Total Organic Carbon (TOC)	8980		50.0	50.0	mg/L	SM 5310B-2014	03/09/26 9:37
26C0140-06 - TS-01-GW-E6							
1,2,4-Trimethylbenzene	11.8		1.55	2.50	ug/L	EPA 8260D	03/04/26 12:24
1,3,5-Trimethylbenzene	3.10		1.74	2.50	ug/L	EPA 8260D	03/04/26 12:24
2-Butanone	85.0	CCVE, ICVE, QL-02	2.10	2.50	ug/L	EPA 8260D	03/04/26 12:24
Acetone	588	CAL-E	33.5	50.0	ug/L	EPA 8260D	03/06/26 1:43
Acrolein	3.85	CCVE, ICVE	2.24	2.50	ug/L	EPA 8260D	03/04/26 12:24
Benzene	23.8		1.40	2.50	ug/L	EPA 8260D	03/04/26 12:24
Methyl tert-butyl ether (MTBE)	18.0		1.22	2.50	ug/L	EPA 8260D	03/04/26 12:24
Methylene chloride	18.6		1.98	10.0	ug/L	EPA 8260D	03/04/26 12:24
o-Xylene	5.30		1.30	2.50	ug/L	EPA 8260D	03/04/26 12:24
p- & m- Xylenes	6.45		2.89	5.00	ug/L	EPA 8260D	03/04/26 12:24
Toluene	4.65		1.73	2.50	ug/L	EPA 8260D	03/04/26 12:24
Xylenes, Total	11.8		4.20	7.50	ug/L	EPA 8260D	03/04/26 12:24
2-Methylnaphthalene	4.37	J	2.50	5.00	ug/L	EPA 8270E	03/05/26 3:43
4-Chloroaniline	6.92		2.50	5.00	ug/L	EPA 8270E	03/05/26 3:43
Acetophenone	3.47	J	2.50	5.00	ug/L	EPA 8270E	03/05/26 3:43
Benzoic acid	64.9		12.5	25.0	ug/L	EPA 8270E	03/05/26 11:57
Acenaphthene	0.562		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 13:26
Acenaphthylene	0.140		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 13:26
* Anthracene	0.546		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 13:26
Benzo(a)anthracene	0.976		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 13:26
Benzo(a)pyrene	0.393		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 13:26
Benzo(b)fluoranthene	0.612		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 13:26
Benzo(g,h,i)perylene	0.386		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 13:26
Benzo(k)fluoranthene	0.615		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 13:26
* Bis(2-ethylhexyl)phthalate	1.24	CCVE	0.500	0.500	ug/L	EPA 8270E SIM	03/05/26 13:26
Chrysene	0.994		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 13:26
Dibenzo(a,h)anthracene	0.144		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 13:26
Fluoranthene	2.40		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 13:26
Fluorene	0.883		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 13:26
Indeno(1,2,3-cd)pyrene	0.337		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 13:26
Naphthalene	24.7		0.500	0.500	ug/L	EPA 8270E SIM	03/09/26 19:01
Phenanthrene	4.15		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 13:26
Pyrene	1.30		0.0500	0.0500	ug/L	EPA 8270E SIM	03/05/26 13:26
Total Organic Carbon (TOC)	7990		50.0	50.0	mg/L	SM 5310B-2014	03/09/26 9:37

26C0140-07 - TS-01-S-E1							
1,2,4-Trimethylbenzene	43	QL-02	0.38	0.76	mg/kg dry	EPA 8260D	03/11/26 9:11
1,3,5-Trimethylbenzene	0.33		0.0032	0.0064	mg/kg dry	EPA 8260D	03/10/26 12:06
Acetone	0.12		0.0064	0.013	mg/kg dry	EPA 8260D	03/10/26 12:06
Benzene	0.40		0.0032	0.0064	mg/kg dry	EPA 8260D	03/10/26 12:06
Carbon disulfide	0.0038	J	0.0032	0.0064	mg/kg dry	EPA 8260D	03/10/26 12:06
Ethyl Benzene	0.12		0.0032	0.0064	mg/kg dry	EPA 8260D	03/10/26 12:06
Isopropylbenzene	0.037		0.0032	0.0064	mg/kg dry	EPA 8260D	03/10/26 12:06
Methyl tert-butyl ether (MTBE)	0.098		0.0032	0.0064	mg/kg dry	EPA 8260D	03/10/26 12:06
Methylcyclohexane	0.027		0.0032	0.0064	mg/kg dry	EPA 8260D	03/10/26 12:06
Methylene chloride	0.016		0.0064	0.013	mg/kg dry	EPA 8260D	03/10/26 12:06
n-Propylbenzene	0.099		0.0032	0.0064	mg/kg dry	EPA 8260D	03/10/26 12:06
o-Xylene	0.29		0.0032	0.0064	mg/kg dry	EPA 8260D	03/10/26 12:06
p- & m- Xylenes	0.48		0.0064	0.013	mg/kg dry	EPA 8260D	03/10/26 12:06
p-Isopropyltoluene	0.010	QL-02	0.0032	0.0064	mg/kg dry	EPA 8260D	03/10/26 12:06
sec-Butylbenzene	0.018		0.0032	0.0064	mg/kg dry	EPA 8260D	03/10/26 12:06
Toluene	0.23		0.0032	0.0064	mg/kg dry	EPA 8260D	03/10/26 12:06
Xylenes, Total	0.78		0.0097	0.019	mg/kg dry	EPA 8260D	03/10/26 12:06
1,1-Biphenyl	0.0926	J	0.0581	0.116	mg/kg dry	EPA 8270E	03/05/26 1:35
2-Methylnaphthalene	1.30		0.0581	0.116	mg/kg dry	EPA 8270E	03/05/26 1:35
Acenaphthene	0.354		0.0581	0.116	mg/kg dry	EPA 8270E	03/05/26 1:35
Acenaphthylene	0.111	J	0.0581	0.116	mg/kg dry	EPA 8270E	03/05/26 1:35
Anthracene	0.645		0.0581	0.116	mg/kg dry	EPA 8270E	03/05/26 1:35
Benzo(a)anthracene	1.01		0.0581	0.116	mg/kg dry	EPA 8270E	03/05/26 1:35
Benzo(a)pyrene	0.680		0.0581	0.116	mg/kg dry	EPA 8270E	03/05/26 1:35
Benzo(b)fluoranthene	0.663		0.0581	0.116	mg/kg dry	EPA 8270E	03/05/26 1:35
Benzo(g,h,i)perylene	0.340	CCVE	0.0581	0.116	mg/kg dry	EPA 8270E	03/05/26 1:35
Benzo(k)fluoranthene	0.584		0.0581	0.116	mg/kg dry	EPA 8270E	03/05/26 1:35
Benzyl butyl phthalate	0.261		0.0581	0.116	mg/kg dry	EPA 8270E	03/05/26 1:35
Bis(2-ethylhexyl)phthalate	1.23		0.0581	0.116	mg/kg dry	EPA 8270E	03/05/26 1:35
Carbazole	0.262		0.0581	0.116	mg/kg dry	EPA 8270E	03/05/26 1:35
Chrysene	0.900		0.0581	0.116	mg/kg dry	EPA 8270E	03/05/26 1:35
Dibenzo(a,h)anthracene	0.119		0.0581	0.116	mg/kg dry	EPA 8270E	03/05/26 1:35
Dibenzofuran	0.235		0.0581	0.116	mg/kg dry	EPA 8270E	03/05/26 1:35
Di-n-octyl phthalate	0.293		0.0581	0.116	mg/kg dry	EPA 8270E	03/05/26 1:35
Fluoranthene	2.28		0.0581	0.116	mg/kg dry	EPA 8270E	03/05/26 1:35
Fluorene	0.450		0.0581	0.116	mg/kg dry	EPA 8270E	03/05/26 1:35
Indeno(1,2,3-cd)pyrene	0.272		0.0581	0.116	mg/kg dry	EPA 8270E	03/05/26 1:35
Naphthalene	2.45		0.0581	0.116	mg/kg dry	EPA 8270E	03/05/26 1:35
Phenanthrene	2.56		0.0581	0.116	mg/kg dry	EPA 8270E	03/05/26 1:35
Pyrene	2.66		0.0581	0.116	mg/kg dry	EPA 8270E	03/05/26 1:35
* % Solids	70.2		0.100	0.100	%	SM 2540G	03/04/26 15:05
26C0140-08 - TS-01-S-E2							
1,2,4-Trimethylbenzene	29	QL-02	0.37	0.75	mg/kg dry	EPA 8260D	03/11/26 9:39
1,3,5-Trimethylbenzene	0.16		0.0031	0.0062	mg/kg dry	EPA 8260D	03/10/26 12:34
Acetone	0.10		0.0062	0.012	mg/kg dry	EPA 8260D	03/10/26 12:34
Benzene	0.41		0.0031	0.0062	mg/kg dry	EPA 8260D	03/10/26 12:34
Carbon disulfide	0.0032	J	0.0031	0.0062	mg/kg dry	EPA 8260D	03/10/26 12:34
cis-1,2-Dichloroethylene	0.0036	J	0.0031	0.0062	mg/kg dry	EPA 8260D	03/10/26 12:34
Ethyl Benzene	0.092		0.0031	0.0062	mg/kg dry	EPA 8260D	03/10/26 12:34
Isopropylbenzene	0.022		0.0031	0.0062	mg/kg dry	EPA 8260D	03/10/26 12:34
Methyl tert-butyl ether (MTBE)	0.12		0.0031	0.0062	mg/kg dry	EPA 8260D	03/10/26 12:34
Methylcyclohexane	0.031		0.0031	0.0062	mg/kg dry	EPA 8260D	03/10/26 12:34

26C0140-08 - TS-01-S-E2							
Methylene chloride	0.014		0.0062	0.012	mg/kg dry	EPA 8260D	03/10/26 12:34
n-Propylbenzene	0.052		0.0031	0.0062	mg/kg dry	EPA 8260D	03/10/26 12:34
o-Xylene	0.22		0.0031	0.0062	mg/kg dry	EPA 8260D	03/10/26 12:34
p- & m- Xylenes	0.36		0.0062	0.012	mg/kg dry	EPA 8260D	03/10/26 12:34
sec-Butylbenzene	0.0074		0.0031	0.0062	mg/kg dry	EPA 8260D	03/10/26 12:34
Toluene	0.22		0.0031	0.0062	mg/kg dry	EPA 8260D	03/10/26 12:34
Xylenes, Total	0.58		0.0092	0.018	mg/kg dry	EPA 8260D	03/10/26 12:34
1,1-Biphenyl	0.0778	J	0.0561	0.112	mg/kg dry	EPA 8270E	03/05/26 2:05
2-Methylnaphthalene	0.971		0.0561	0.112	mg/kg dry	EPA 8270E	03/05/26 2:05
2-Methylphenol	0.0599	J	0.0561	0.112	mg/kg dry	EPA 8270E	03/05/26 2:05
4-Chloro-3-methylphenol	0.0706	J	0.0561	0.112	mg/kg dry	EPA 8270E	03/05/26 2:05
4-Nitrophenol	0.201	J, CAL-E	0.112	0.223	mg/kg dry	EPA 8270E	03/05/26 2:05
Acenaphthene	0.274		0.0561	0.112	mg/kg dry	EPA 8270E	03/05/26 2:05
Acenaphthylene	0.118		0.0561	0.112	mg/kg dry	EPA 8270E	03/05/26 2:05
Acetophenone	0.118		0.0561	0.112	mg/kg dry	EPA 8270E	03/05/26 2:05
Anthracene	2.26		0.0561	0.112	mg/kg dry	EPA 8270E	03/05/26 2:05
Atrazine	0.0787	J	0.0561	0.112	mg/kg dry	EPA 8270E	03/05/26 2:05
Benzaldehyde	2.18	CAL-E	0.0561	0.112	mg/kg dry	EPA 8270E	03/05/26 2:05
Benzo(a)anthracene	0.875		0.0561	0.112	mg/kg dry	EPA 8270E	03/05/26 2:05
Benzo(a)pyrene	0.682		0.0561	0.112	mg/kg dry	EPA 8270E	03/05/26 2:05
Benzo(b)fluoranthene	0.607		0.0561	0.112	mg/kg dry	EPA 8270E	03/05/26 2:05
Benzo(g,h,i)perylene	0.317	CCVE	0.0561	0.112	mg/kg dry	EPA 8270E	03/05/26 2:05
Benzo(k)fluoranthene	0.561		0.0561	0.112	mg/kg dry	EPA 8270E	03/05/26 2:05
Benzoic acid	0.265	CAL-E, CCVE	0.0561	0.112	mg/kg dry	EPA 8270E	03/05/26 2:05
Benzyl alcohol	0.0626	J	0.0561	0.112	mg/kg dry	EPA 8270E	03/05/26 2:05
Benzyl butyl phthalate	0.455		0.0561	0.112	mg/kg dry	EPA 8270E	03/05/26 2:05
Bis(2-ethylhexyl)phthalate	0.983		0.0561	0.112	mg/kg dry	EPA 8270E	03/05/26 2:05
Carbazole	0.198		0.0561	0.112	mg/kg dry	EPA 8270E	03/05/26 2:05
Chrysene	0.893		0.0561	0.112	mg/kg dry	EPA 8270E	03/05/26 2:05
Dibenzofuran	0.173		0.0561	0.112	mg/kg dry	EPA 8270E	03/05/26 2:05
Dimethyl phthalate	0.0671	J	0.0561	0.112	mg/kg dry	EPA 8270E	03/05/26 2:05
Di-n-butyl phthalate	0.0841	J	0.0561	0.112	mg/kg dry	EPA 8270E	03/05/26 2:05
Di-n-octyl phthalate	0.0787	J	0.0561	0.112	mg/kg dry	EPA 8270E	03/05/26 2:05
Fluoranthene	1.87		0.0561	0.112	mg/kg dry	EPA 8270E	03/05/26 2:05
Fluorene	0.338		0.0561	0.112	mg/kg dry	EPA 8270E	03/05/26 2:05
Hexachlorobenzene	0.105	J	0.0561	0.112	mg/kg dry	EPA 8270E	03/05/26 2:05
Hexachloroethane	0.185		0.0561	0.112	mg/kg dry	EPA 8270E	03/05/26 2:05
Indeno(1,2,3-cd)pyrene	0.291		0.0561	0.112	mg/kg dry	EPA 8270E	03/05/26 2:05
Naphthalene	1.79		0.0561	0.112	mg/kg dry	EPA 8270E	03/05/26 2:05
N-Nitrosodiphenylamine	0.0742	J	0.0561	0.112	mg/kg dry	EPA 8270E	03/05/26 2:05
Phenanthrene	2.08		0.0561	0.112	mg/kg dry	EPA 8270E	03/05/26 2:05
Pyrene	2.64		0.0561	0.112	mg/kg dry	EPA 8270E	03/05/26 2:05
* % Solids	71.6		0.100	0.100	%	SM 2540G	03/04/26 15:05
26C0140-09 - TS-01-S-E3							
1,2,4-Trimethylbenzene	0.52		0.0033	0.0067	mg/kg dry	EPA 8260D	03/10/26 13:01
1,3,5-Trimethylbenzene	0.15		0.0033	0.0067	mg/kg dry	EPA 8260D	03/10/26 13:01
Acetone	0.088		0.0067	0.013	mg/kg dry	EPA 8260D	03/10/26 13:01
Benzene	0.52		0.0033	0.0067	mg/kg dry	EPA 8260D	03/10/26 13:01
Carbon disulfide	0.0044	J	0.0033	0.0067	mg/kg dry	EPA 8260D	03/10/26 13:01
Ethyl Benzene	0.073		0.0033	0.0067	mg/kg dry	EPA 8260D	03/10/26 13:01
Isopropylbenzene	0.018		0.0033	0.0067	mg/kg dry	EPA 8260D	03/10/26 13:01

26C0140-09 - TS-01-S-E3							
Methyl tert-butyl ether (MTBE)	0.13		0.0033	0.0067	mg/kg dry	EPA 8260D	03/10/26 13:01
Methylcyclohexane	0.042		0.0033	0.0067	mg/kg dry	EPA 8260D	03/10/26 13:01
Methylene chloride	0.016		0.0067	0.013	mg/kg dry	EPA 8260D	03/10/26 13:01
n-Propylbenzene	0.044		0.0033	0.0067	mg/kg dry	EPA 8260D	03/10/26 13:01
o-Xylene	0.21		0.0033	0.0067	mg/kg dry	EPA 8260D	03/10/26 13:01
p- & m- Xylenes	0.32		0.0067	0.013	mg/kg dry	EPA 8260D	03/10/26 13:01
p-Isopropyltoluene	0.0058	J, QL-02	0.0033	0.0067	mg/kg dry	EPA 8260D	03/10/26 13:01
sec-Butylbenzene	0.0079		0.0033	0.0067	mg/kg dry	EPA 8260D	03/10/26 13:01
Toluene	0.25		0.0033	0.0067	mg/kg dry	EPA 8260D	03/10/26 13:01
Xylenes, Total	0.53		0.010	0.020	mg/kg dry	EPA 8260D	03/10/26 13:01
1,1-Biphenyl	0.229		0.0553	0.110	mg/kg dry	EPA 8270E	03/05/26 2:35
2-Methylnaphthalene	2.70		0.0553	0.110	mg/kg dry	EPA 8270E	03/05/26 2:35
Acenaphthene	1.87		0.0553	0.110	mg/kg dry	EPA 8270E	03/05/26 2:35
Acenaphthylene	0.329		0.0553	0.110	mg/kg dry	EPA 8270E	03/05/26 2:35
Anthracene	4.28		1.38	2.76	mg/kg dry	EPA 8270E	03/05/26 18:36
Benzo(a)anthracene	5.16		1.38	2.76	mg/kg dry	EPA 8270E	03/05/26 18:36
Benzo(a)pyrene	3.02		1.38	2.76	mg/kg dry	EPA 8270E	03/05/26 18:36
Benzo(b)fluoranthene	2.96		1.38	2.76	mg/kg dry	EPA 8270E	03/05/26 18:36
Benzo(g,h,i)perylene	2.32	CCVE	0.0553	0.110	mg/kg dry	EPA 8270E	03/05/26 2:35
Benzo(k)fluoranthene	2.98		1.38	2.76	mg/kg dry	EPA 8270E	03/05/26 18:36
Benzyl butyl phthalate	0.548		0.0553	0.110	mg/kg dry	EPA 8270E	03/05/26 2:35
Bis(2-ethylhexyl)phthalate	2.44		0.0553	0.110	mg/kg dry	EPA 8270E	03/05/26 2:35
Carbazole	0.904		0.0553	0.110	mg/kg dry	EPA 8270E	03/05/26 2:35
Chrysene	5.12		1.38	2.76	mg/kg dry	EPA 8270E	03/05/26 18:36
Dibenzo(a,h)anthracene	0.290		0.0553	0.110	mg/kg dry	EPA 8270E	03/05/26 2:35
Dibenzofuran	1.18		0.0553	0.110	mg/kg dry	EPA 8270E	03/05/26 2:35
Di-n-butyl phthalate	0.146		0.0553	0.110	mg/kg dry	EPA 8270E	03/05/26 2:35
Di-n-octyl phthalate	0.0786	J	0.0553	0.110	mg/kg dry	EPA 8270E	03/05/26 2:35
Fluoranthene	12.4		1.38	2.76	mg/kg dry	EPA 8270E	03/05/26 18:36
Fluorene	2.95		0.0553	0.110	mg/kg dry	EPA 8270E	03/05/26 2:35
Indeno(1,2,3-cd)pyrene	2.76		0.0553	0.110	mg/kg dry	EPA 8270E	03/05/26 2:35
Naphthalene	4.28		1.38	2.76	mg/kg dry	EPA 8270E	03/05/26 18:36
Phenanthrene	12.0		1.38	2.76	mg/kg dry	EPA 8270E	03/05/26 18:36
Pyrene	12.6		1.38	2.76	mg/kg dry	EPA 8270E	03/05/26 18:36
* % Solids	75.5		0.100	0.100	%	SM 2540G	03/04/26 15:05
26C0140-10 - TS-01-S-E4							
1,2,4-Trimethylbenzene	0.40		0.0038	0.0076	mg/kg dry	EPA 8260D	03/10/26 13:29
1,3,5-Trimethylbenzene	0.13		0.0038	0.0076	mg/kg dry	EPA 8260D	03/10/26 13:29
2-Butanone	0.038		0.0038	0.0076	mg/kg dry	EPA 8260D	03/10/26 13:29
Acetone	0.29		0.0076	0.015	mg/kg dry	EPA 8260D	03/10/26 13:29
Benzene	0.24		0.0038	0.0076	mg/kg dry	EPA 8260D	03/10/26 13:29
Carbon disulfide	0.049		0.0038	0.0076	mg/kg dry	EPA 8260D	03/10/26 13:29
Cyclohexane	0.055		0.0038	0.0076	mg/kg dry	EPA 8260D	03/10/26 13:29
Ethyl Benzene	0.055		0.0038	0.0076	mg/kg dry	EPA 8260D	03/10/26 13:29
Isopropylbenzene	0.014		0.0038	0.0076	mg/kg dry	EPA 8260D	03/10/26 13:29
Methyl tert-butyl ether (MTBE)	0.043		0.0038	0.0076	mg/kg dry	EPA 8260D	03/10/26 13:29
Methylcyclohexane	0.040		0.0038	0.0076	mg/kg dry	EPA 8260D	03/10/26 13:29
Methylene chloride	0.016		0.0076	0.015	mg/kg dry	EPA 8260D	03/10/26 13:29
n-Butylbenzene	0.021	QL-02, CCVE	0.0038	0.0076	mg/kg dry	EPA 8260D	03/10/26 13:29
n-Propylbenzene	0.030		0.0038	0.0076	mg/kg dry	EPA 8260D	03/10/26 13:29
o-Xylene	0.17		0.0038	0.0076	mg/kg dry	EPA 8260D	03/10/26 13:29

26C0140-10 - TS-01-S-E4							
p- & m- Xylenes	0.24		0.0076	0.015	mg/kg dry	EPA 8260D	03/10/26 13:29
p-Isopropyltoluene	0.0041	J, QL-02	0.0038	0.0076	mg/kg dry	EPA 8260D	03/10/26 13:29
sec-Butylbenzene	0.0062	J	0.0038	0.0076	mg/kg dry	EPA 8260D	03/10/26 13:29
tert-Butyl alcohol (TBA)	0.14		0.019	0.038	mg/kg dry	EPA 8260D	03/10/26 13:29
Toluene	0.16		0.0038	0.0076	mg/kg dry	EPA 8260D	03/10/26 13:29
Xylenes, Total	0.41		0.011	0.023	mg/kg dry	EPA 8260D	03/10/26 13:29
1,1-Biphenyl	0.520		0.0613	0.122	mg/kg dry	EPA 8270E	03/05/26 3:06
2-Methylnaphthalene	11.9		1.53	3.06	mg/kg dry	EPA 8270E	03/05/26 19:06
Acenaphthene	0.673		0.0613	0.122	mg/kg dry	EPA 8270E	03/05/26 3:06
Acenaphthylene	1.24		0.0613	0.122	mg/kg dry	EPA 8270E	03/05/26 3:06
Anthracene	1.36		0.0613	0.122	mg/kg dry	EPA 8270E	03/05/26 3:06
Benzo(a)anthracene	2.21		0.0613	0.122	mg/kg dry	EPA 8270E	03/05/26 3:06
Benzo(a)pyrene	1.47		0.0613	0.122	mg/kg dry	EPA 8270E	03/05/26 3:06
Benzo(b)fluoranthene	1.39		0.0613	0.122	mg/kg dry	EPA 8270E	03/05/26 3:06
Benzo(g,h,i)perylene	0.607	CCVE	0.0613	0.122	mg/kg dry	EPA 8270E	03/05/26 3:06
Benzo(k)fluoranthene	1.20		0.0613	0.122	mg/kg dry	EPA 8270E	03/05/26 3:06
Benzyl butyl phthalate	0.704		0.0613	0.122	mg/kg dry	EPA 8270E	03/05/26 3:06
Bis(2-ethylhexyl)phthalate	1.30		0.0613	0.122	mg/kg dry	EPA 8270E	03/05/26 3:06
Carbazole	0.309		0.0613	0.122	mg/kg dry	EPA 8270E	03/05/26 3:06
Chrysene	2.02		0.0613	0.122	mg/kg dry	EPA 8270E	03/05/26 3:06
Di-n-octyl phthalate	0.116	J	0.0613	0.122	mg/kg dry	EPA 8270E	03/05/26 3:06
Fluoranthene	5.55		1.53	3.06	mg/kg dry	EPA 8270E	03/05/26 19:06
Fluorene	2.02		0.0613	0.122	mg/kg dry	EPA 8270E	03/05/26 3:06
Indeno(1,2,3-cd)pyrene	0.599		0.0613	0.122	mg/kg dry	EPA 8270E	03/05/26 3:06
Naphthalene	25.8		1.53	3.06	mg/kg dry	EPA 8270E	03/05/26 19:06
Phenanthrene	6.21		1.53	3.06	mg/kg dry	EPA 8270E	03/05/26 19:06
Pyrene	5.89		1.53	3.06	mg/kg dry	EPA 8270E	03/05/26 19:06
* % Solids	64.0		0.100	0.100	%	SM 2540G	03/04/26 15:05
26C0140-11 - TS-01-S-E5							
1,2,4-Trimethylbenzene	0.31		0.0029	0.0058	mg/kg dry	EPA 8260D	03/10/26 13:56
1,3,5-Trimethylbenzene	0.099		0.0029	0.0058	mg/kg dry	EPA 8260D	03/10/26 13:56
2-Butanone	0.028		0.0029	0.0058	mg/kg dry	EPA 8260D	03/10/26 13:56
Acetone	0.21		0.0058	0.012	mg/kg dry	EPA 8260D	03/10/26 13:56
Benzene	0.21		0.0029	0.0058	mg/kg dry	EPA 8260D	03/10/26 13:56
Carbon disulfide	0.028		0.0029	0.0058	mg/kg dry	EPA 8260D	03/10/26 13:56
Cyclohexane	0.026		0.0029	0.0058	mg/kg dry	EPA 8260D	03/10/26 13:56
Ethyl Benzene	0.040		0.0029	0.0058	mg/kg dry	EPA 8260D	03/10/26 13:56
Isopropylbenzene	0.011		0.0029	0.0058	mg/kg dry	EPA 8260D	03/10/26 13:56
Methyl tert-butyl ether (MTBE)	0.025		0.0029	0.0058	mg/kg dry	EPA 8260D	03/10/26 13:56
Methylcyclohexane	0.021		0.0029	0.0058	mg/kg dry	EPA 8260D	03/10/26 13:56
Methylene chloride	0.015		0.0058	0.012	mg/kg dry	EPA 8260D	03/10/26 13:56
n-Propylbenzene	0.025		0.0029	0.0058	mg/kg dry	EPA 8260D	03/10/26 13:56
o-Xylene	0.12		0.0029	0.0058	mg/kg dry	EPA 8260D	03/10/26 13:56
p- & m- Xylenes	0.18		0.0058	0.012	mg/kg dry	EPA 8260D	03/10/26 13:56
p-Isopropyltoluene	0.0031	J, QL-02	0.0029	0.0058	mg/kg dry	EPA 8260D	03/10/26 13:56
sec-Butylbenzene	0.0054	J	0.0029	0.0058	mg/kg dry	EPA 8260D	03/10/26 13:56
tert-Butyl alcohol (TBA)	0.10		0.015	0.029	mg/kg dry	EPA 8260D	03/10/26 13:56
Toluene	0.10		0.0029	0.0058	mg/kg dry	EPA 8260D	03/10/26 13:56
Xylenes, Total	0.30		0.0087	0.017	mg/kg dry	EPA 8260D	03/10/26 13:56
2-Methylnaphthalene	29.7		2.94	5.87	mg/kg dry	EPA 8270E	03/05/26 16:06
Anthracene	2.96	J	2.94	5.87	mg/kg dry	EPA 8270E	03/05/26 16:06
Benzo(a)anthracene	4.18	J	2.94	5.87	mg/kg dry	EPA 8270E	03/05/26 16:06

26C0140-11 - TS-01-S-E5							
Benzo(a)pyrene	3.19	J	2.94	5.87	mg/kg dry	EPA 8270E	03/05/26 16:06
Benzo(b)fluoranthene	3.01	J	2.94	5.87	mg/kg dry	EPA 8270E	03/05/26 16:06
Bis(2-ethylhexyl)phthalate	3.10	J	2.94	5.87	mg/kg dry	EPA 8270E	03/05/26 16:06
Chrysene	3.57	J	2.94	5.87	mg/kg dry	EPA 8270E	03/05/26 16:06
Fluoranthene	7.18		2.94	5.87	mg/kg dry	EPA 8270E	03/05/26 16:06
Fluorene	5.12	J	2.94	5.87	mg/kg dry	EPA 8270E	03/05/26 16:06
Naphthalene	62.4		2.94	5.87	mg/kg dry	EPA 8270E	03/05/26 16:06
Phenanthrene	11.3		2.94	5.87	mg/kg dry	EPA 8270E	03/05/26 16:06
Pyrene	8.17		2.94	5.87	mg/kg dry	EPA 8270E	03/05/26 16:06
* % Solids	70.9		0.100	0.100	%	SM 2540G	03/04/26 15:05
26C0140-12 - TS-01-S-E6							
1,2,4-Trimethylbenzene	0.42		0.0038	0.0075	mg/kg dry	EPA 8260D	03/11/26 18:07
1,2-Dichloroethane	0.0086		0.0038	0.0075	mg/kg dry	EPA 8260D	03/11/26 18:07
1,3,5-Trimethylbenzene	0.14		0.0038	0.0075	mg/kg dry	EPA 8260D	03/11/26 18:07
2-Butanone	0.037		0.0038	0.0075	mg/kg dry	EPA 8260D	03/11/26 18:07
Acetone	0.32		0.0075	0.015	mg/kg dry	EPA 8260D	03/11/26 18:07
Benzene	0.26		0.0038	0.0075	mg/kg dry	EPA 8260D	03/11/26 18:07
Carbon disulfide	0.037		0.0038	0.0075	mg/kg dry	EPA 8260D	03/11/26 18:07
Cyclohexane	0.049		0.0038	0.0075	mg/kg dry	EPA 8260D	03/11/26 18:07
Ethyl Benzene	0.053		0.0038	0.0075	mg/kg dry	EPA 8260D	03/11/26 18:07
Isopropylbenzene	0.013		0.0038	0.0075	mg/kg dry	EPA 8260D	03/11/26 18:07
Methyl tert-butyl ether (MTBE)	0.028		0.0038	0.0075	mg/kg dry	EPA 8260D	03/11/26 18:07
Methylcyclohexane	0.037		0.0038	0.0075	mg/kg dry	EPA 8260D	03/11/26 18:07
Methylene chloride	0.027		0.0075	0.015	mg/kg dry	EPA 8260D	03/11/26 18:07
n-Butylbenzene	0.022	QL-02	0.0038	0.0075	mg/kg dry	EPA 8260D	03/11/26 18:07
n-Propylbenzene	0.028		0.0038	0.0075	mg/kg dry	EPA 8260D	03/11/26 18:07
o-Xylene	0.19		0.0038	0.0075	mg/kg dry	EPA 8260D	03/11/26 18:07
p- & m- Xylenes	0.26		0.0075	0.015	mg/kg dry	EPA 8260D	03/11/26 18:07
p-Isopropyltoluene	0.0045	J, QL-02	0.0038	0.0075	mg/kg dry	EPA 8260D	03/11/26 18:07
sec-Butylbenzene	0.0064	J	0.0038	0.0075	mg/kg dry	EPA 8260D	03/11/26 18:07
tert-Butyl alcohol (TBA)	0.12	CCVE	0.019	0.038	mg/kg dry	EPA 8260D	03/11/26 18:07
Toluene	0.15		0.0038	0.0075	mg/kg dry	EPA 8260D	03/11/26 18:07
Xylenes, Total	0.45		0.011	0.023	mg/kg dry	EPA 8260D	03/11/26 18:07
2-Methylnaphthalene	9.30		1.19	2.37	mg/kg dry	EPA 8270E	03/05/26 16:35
Acenaphthene	1.92	J	1.19	2.37	mg/kg dry	EPA 8270E	03/05/26 16:35
Anthracene	2.85		1.19	2.37	mg/kg dry	EPA 8270E	03/05/26 16:35
Benzo(a)anthracene	3.25		1.19	2.37	mg/kg dry	EPA 8270E	03/05/26 16:35
Benzo(a)pyrene	2.70		1.19	2.37	mg/kg dry	EPA 8270E	03/05/26 16:35
Benzo(b)fluoranthene	2.41		1.19	2.37	mg/kg dry	EPA 8270E	03/05/26 16:35
Benzo(k)fluoranthene	2.26	J	1.19	2.37	mg/kg dry	EPA 8270E	03/05/26 16:35
Benzyl butyl phthalate	1.23	J	1.19	2.37	mg/kg dry	EPA 8270E	03/05/26 16:35
Bis(2-ethylhexyl)phthalate	3.51		1.19	2.37	mg/kg dry	EPA 8270E	03/05/26 16:35
Chrysene	3.40		1.19	2.37	mg/kg dry	EPA 8270E	03/05/26 16:35
Dibenzofuran	1.42	J	1.19	2.37	mg/kg dry	EPA 8270E	03/05/26 16:35
Fluoranthene	8.62		1.19	2.37	mg/kg dry	EPA 8270E	03/05/26 16:35
Fluorene	2.56		1.19	2.37	mg/kg dry	EPA 8270E	03/05/26 16:35
Naphthalene	19.4		1.19	2.37	mg/kg dry	EPA 8270E	03/05/26 16:35
Phenanthrene	9.99		1.19	2.37	mg/kg dry	EPA 8270E	03/05/26 16:35
Pyrene	8.24		1.19	2.37	mg/kg dry	EPA 8270E	03/05/26 16:35
* % Solids	70.2		0.100	0.100	%	SM 2540G	03/04/26 15:05

Sample Information

Client Sample ID: TS-01-GW-E1 **Sample ID:** 26C0140-01

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 12:30 pm	03/03/2026

VOA, 8260 LOW MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND		ug/L	2.16	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-55-6	1,1,1-Trichloroethane	ND		ug/L	2.66	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-34-5	1,1,2,2-Tetrachloroethane	ND		ug/L	2.56	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		ug/L	2.86	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-00-5	1,1,2-Trichloroethane	ND		ug/L	2.49	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-34-3	1,1-Dichloroethane	ND		ug/L	2.72	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-35-4	1,1-Dichloroethylene	ND		ug/L	3.27	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-61-6	1,2,3-Trichlorobenzene	ND		ug/L	2.22	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
96-18-4	1,2,3-Trichloropropane	ND		ug/L	2.73	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
120-82-1	1,2,4-Trichlorobenzene	ND		ug/L	1.38	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
95-63-6	1,2,4-Trimethylbenzene	**225**		ug/L	3.10	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
96-12-8	1,2-Dibromo-3-chloropropane	ND		ug/L	4.32	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-93-4	1,2-Dibromoethane	ND		ug/L	2.15	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-50-1	1,2-Dichlorobenzene	ND		ug/L	2.70	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-06-2	1,2-Dichloroethane	ND		ug/L	3.77	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-87-5	1,2-Dichloropropane	ND		ug/L	3.27	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-67-8	1,3,5-Trimethylbenzene	**56.3**		ug/L	3.47	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
541-73-1	1,3-Dichlorobenzene	ND		ug/L	2.83	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-46-7	1,4-Dichlorobenzene	ND		ug/L	3.11	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-93-3	2-Butanone	**77.5**	CCVE, ICVE, QL-02	ug/L	4.21	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: TS-01-GW-E1 **Sample ID:** 26C0140-01

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 12:30 pm	03/03/2026

VOA, 8260 LOW MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
591-78-6	2-Hexanone	ND		ug/L	3.20	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-10-1	4-Methyl-2-pentanone	**72.5**	CCVE, ICVE, QL-02	ug/L	3.65	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-64-1	Acetone	**361**	CAL-E	ug/L	33.5	50.0	25	EPA 8260D	03/05/2026 08:00	03/06/2026 02:12	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-02-8	Acrolein	ND	ICVE	ug/L	4.47	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-13-1	Acrylonitrile	ND		ug/L	4.22	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-43-2	Benzene	**598**		ug/L	2.79	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-97-5	Bromochloromethane	ND		ug/L	3.54	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
75-27-4	Bromodichloromethane	ND		ug/L	2.45	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-25-2	Bromoform	ND		ug/L	1.63	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-83-9	Bromomethane	ND	CCVE	ug/L	5.00	20.0	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-15-0	Carbon disulfide	ND		ug/L	3.62	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
56-23-5	Carbon tetrachloride	ND		ug/L	2.04	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-90-7	Chlorobenzene	ND		ug/L	2.84	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-00-3	Chloroethane	ND		ug/L	4.48	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-66-3	Chloroform	ND		ug/L	2.43	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-87-3	Chloromethane	ND	CCVE	ug/L	3.72	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-59-2	cis-1,2-Dichloroethylene	ND		ug/L	2.94	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-01-5	cis-1,3-Dichloropropylene	ND		ug/L	2.62	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
110-82-7	Cyclohexane	ND		ug/L	4.91	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
124-48-1	Dibromochloromethane	ND		ug/L	1.46	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-95-3	Dibromomethane	ND		ug/L	2.03	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		

Sample Information

Client Sample ID: TS-01-GW-E1 **Sample ID:** 26C0140-01

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 12:30 pm	03/03/2026

VOA, 8260 LOW MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-71-8	Dichlorodifluoromethane	ND	CCVE, ICVE	ug/L	4.51	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
100-41-4	Ethyl Benzene	**31.9**		ug/L	2.90	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-68-3	Hexachlorobutadiene	ND		ug/L	2.41	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	NYSDOH-NY12058,PADEP-68-04440		
98-82-8	Isopropylbenzene	**5.40**		ug/L	4.05	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-20-9	Methyl acetate	ND		ug/L	4.42	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
1634-04-4	Methyl tert-butyl ether (MTBE)	**365**		ug/L	2.44	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-87-2	Methylcyclohexane	ND		ug/L	4.77	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
75-09-2	Methylene chloride	**25.1**		ug/L	3.97	20.0	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
104-51-8	n-Butylbenzene	ND		ug/L	3.99	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
103-65-1	n-Propylbenzene	**13.6**		ug/L	3.84	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-47-6	o-Xylene	**122**		ug/L	2.61	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
179601-23-1	p- & m- Xylenes	**141**		ug/L	5.78	10.0	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
99-87-6	p-Isopropyltoluene	ND		ug/L	3.77	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
135-98-8	sec-Butylbenzene	ND		ug/L	4.44	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
100-42-5	Styrene	**12.6**		ug/L	2.55	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-65-0	tert-Butyl alcohol (TBA)	ND		ug/L	6.08	10.0	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
98-06-6	tert-Butylbenzene	ND		ug/L	3.67	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
127-18-4	Tetrachloroethylene	ND		ug/L	2.39	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-88-3	Toluene	**95.3**		ug/L	3.46	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-60-5	trans-1,2-Dichloroethylene	ND		ug/L	2.79	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-02-6	trans-1,3-Dichloropropylene	ND		ug/L	2.29	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: TS-01-GW-E1 **Sample ID:** 26C0140-01

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 12:30 pm	03/03/2026

VOA, 8260 LOW MASTER

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
79-01-6	Trichloroethylene	ND		ug/L	2.49	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-69-4	Trichlorofluoromethane	ND		ug/L	3.37	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-01-4	Vinyl Chloride	ND		ug/L	4.69	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
1330-20-7	Xylenes, Total	**263**		ug/L	8.39	15.0	10	EPA 8260D	03/04/2026 08:00	03/04/2026 12:53	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: SURR: 1,2-Dichloroethane-d4*	*102 %*	*69-130*
17060-07-0	*Surrogate: SURR: 1,2-Dichloroethane-d4*	*110 %*	*69-130*
2037-26-5	*Surrogate: SURR: Toluene-d8*	*99.4 %*	*81-117*
2037-26-5	*Surrogate: SURR: Toluene-d8*	*108 %*	*81-117*
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*102 %*	*79-122*
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*107 %*	*79-122*

SVOA, 8270 LOW MASTER

Log-in Notes:

Sample Notes: EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
92-52-4	1,1-Biphenyl	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	NYSDOH-NY10854,PADEP-68-04440		
122-66-7	1,2-Diphenylhydrazine (as Azobenzene)	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
58-90-2	2,3,4,6-Tetrachlorophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	NYSDOH-NY10854,PADEP-68-04440		
95-95-4	2,4,5-Trichlorophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
88-06-2	2,4,6-Trichlorophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
120-83-2	2,4-Dichlorophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
105-67-9	2,4-Dimethylphenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
51-28-5	* 2,4-Dinitrophenol	ND	CAL-E	ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005		
121-14-2	2,4-Dinitrotoluene	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
606-20-2	2,6-Dinitrotoluene	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		

Sample Information

Client Sample ID: TS-01-GW-E1 **Sample ID:** 26C0140-01

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 12:30 pm	03/03/2026

SVOA, 8270 LOW MASTER **Log-in Notes:** **Sample Notes:** EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
91-58-7	2-Chloronaphthalene	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
95-57-8	2-Chlorophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
91-57-6	2-Methylnaphthalene	**16.8**		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
95-48-7	2-Methylphenol	**8.74**		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
88-74-4	2-Nitroaniline	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
88-75-5	2-Nitrophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
65794-96-9	* 3- & 4-Methylphenols	**37.4**		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	CTDPH-PH-0840		
91-94-1	3,3-Dichlorobenzidine	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
99-09-2	3-Nitroaniline	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
534-52-1	4,6-Dinitro-2-methylphenol	ND	CAL-E	ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
101-55-3	4-Bromophenyl phenyl ether	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
59-50-7	4-Chloro-3-methylphenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
106-47-8	4-Chloroaniline	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
7005-72-3	4-Chlorophenyl phenyl ether	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
100-01-6	4-Nitroaniline	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
100-02-7	4-Nitrophenol	ND	QL-02	ug/L	5.00	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
98-86-2	Acetophenone	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
62-53-3	Aniline	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
100-52-7	Benzaldehyde	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
92-87-5	Benzidine	ND	CAL-E, CCVE	ug/L	5.00	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
65-85-0	Benzoic acid	**33.4**	QL-02	ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		

Sample Information

Client Sample ID: TS-01-GW-E1 **Sample ID:** 26C0140-01

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 12:30 pm	03/03/2026

SVOA, 8270 LOW MASTER **Log-in Notes:** **Sample Notes:** EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
100-51-6	Benzyl alcohol	**11.9**		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
85-68-7	Benzyl butyl phthalate	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
111-91-1	Bis(2-chloroethoxy)methane	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
111-44-4	Bis(2-chloroethyl)ether	ND		ug/L	1.00	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
108-60-1	Bis(2-chloroisopropyl)ether	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
105-60-2	Caprolactam	ND	ICVE	ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
86-74-8	Carbazole	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
132-64-9	Dibenzofuran	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
84-66-2	Diethyl phthalate	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
131-11-3	Dimethyl phthalate	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
84-74-2	Di-n-butyl phthalate	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
117-84-0	Di-n-octyl phthalate	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
122-39-4	Diphenylamine	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	NYSDOH-NY10854,PADEP-68-04440		
77-47-4	Hexachlorocyclopentadiene	ND	CAL-E	ug/L	5.00	10.0	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
78-59-1	Isophorone	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
621-64-7	N-nitroso-di-n-propylamine	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
86-30-6	N-Nitrosodiphenylamine	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
108-95-2	Phenol	**27.3**		ug/L	0.750	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
110-86-1	Pyridine	ND	QL-02	ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:00	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		

	Surrogate Recoveries	Result		Acceptance Range
367-12-4	*Surrogate: SURR: 2-Fluorophenol*	*16.4 %*	S-08	*19.7-63.1*
13127-88-3	*Surrogate: SURR: Phenol-d6*	*10.6 %*		*10.1-41.7*
4165-60-0	*Surrogate: SURR: Nitrobenzene-d5*	*31.4 %*	S-08	*50.2-113*
321-60-8	*Surrogate: SURR: 2-Fluorobiphenyl*	*28.1 %*	S-08	*39.9-105*

Sample Information

Client Sample ID: TS-01-GW-E1 **Sample ID:** 26C0140-01

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 12:30 pm	03/03/2026

SVOA, 8270 LOW MASTER

Log-in Notes: **Sample Notes:** EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
118-79-6	*Surrogate: SURR: 2,4,6-Tribromophenol*	*32.0 %*	S-08		*39.3-151*						
1718-51-0	*Surrogate: SURR: Terphenyl-d14*	*35.0 %*			*30.7-106*						

SVOA, 8270 SIM MASTER

Log-in Notes: **Sample Notes:** EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	**4.00**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:17	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
208-96-8	Acenaphthylene	**0.290**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:17	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
120-12-7	* Anthracene	**3.36**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:17	SR
								Certifications:			
1912-24-9	* Atrazine	ND		ug/L	0.500	0.500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:17	SR
								Certifications:			
56-55-3	Benzo(a)anthracene	**1.06**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:17	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
50-32-8	Benzo(a)pyrene	**0.497**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:17	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
205-99-2	Benzo(b)fluoranthene	**0.421**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:17	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
191-24-2	Benzo(g,h,i)perylene	**0.266**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:17	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
207-08-9	Benzo(k)fluoranthene	**0.483**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:17	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
117-81-7	* Bis(2-ethylhexyl)phthalate	**1.36**		ug/L	0.500	0.500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:17	SR
								Certifications:			
218-01-9	Chrysene	**0.680**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:17	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
53-70-3	Dibenzo(a,h)anthracene	**0.119**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:17	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
206-44-0	Fluoranthene	**2.60**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:17	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
86-73-7	Fluorene	**2.88**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:17	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
118-74-1	* Hexachlorobenzene	ND		ug/L	0.0200	0.0200	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:17	SR
								Certifications:			
87-68-3	* Hexachlorobutadiene	ND	QL-02	ug/L	0.500	0.500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:17	SR
								Certifications:			
67-72-1	* Hexachloroethane	ND		ug/L	0.500	0.500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:17	SR
								Certifications:			

Sample Information

Client Sample ID: TS-01-GW-E1 **Sample ID:** 26C0140-01

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 12:30 pm	03/03/2026

SVOA, 8270 SIM MASTER

Log-in Notes:

Sample Notes: EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
193-39-5	Indeno(1,2,3-cd)pyrene	**0.237**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:17	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
91-20-3	Naphthalene	**70.3**		ug/L	1.00	1.00	20	EPA 8270E SIM	03/05/2026 10:21	03/09/2026 16:27	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
98-95-3	* Nitrobenzene	ND	ICVE	ug/L	0.250	0.250	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:17	SR
								Certifications:			
62-75-9	* N-Nitrosodimethylamine	ND	QL-02	ug/L	0.500	0.500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:17	SR
								Certifications:			
87-86-5	* Pentachlorophenol	ND		ug/L	0.250	0.250	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:17	SR
								Certifications:			
85-01-8	Phenanthrene	**5.72**		ug/L	1.00	1.00	20	EPA 8270E SIM	03/05/2026 10:21	03/09/2026 16:27	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
129-00-0	Pyrene	**2.18**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:17	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			

Total Organic Carbon

Log-in Notes:

Sample Notes:

Sample Prepared by Method: Analysis Preparation

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
TOC	Total Organic Carbon (TOC)	**1150**		mg/L	50.0	50.0	50	SM 5310B-2014	03/05/2026 14:19	03/09/2026 09:37	JAMT
								Certifications: NYSDOH-NY10854,CTDPH-PH-0840,NJDEP-CT005,PADEP-68-0			

Sample Information

Client Sample ID: TS-01-GW-E2 **Sample ID:** 26C0140-02

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 12:45 pm	03/03/2026

VOA, 8260 LOW MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND		ug/L	2.16	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-55-6	1,1,1-Trichloroethane	ND		ug/L	2.66	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-34-5	1,1,2,2-Tetrachloroethane	ND		ug/L	2.56	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		ug/L	2.86	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-00-5	1,1,2-Trichloroethane	ND		ug/L	2.49	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-34-3	1,1-Dichloroethane	ND		ug/L	2.72	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-35-4	1,1-Dichloroethylene	ND		ug/L	3.27	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-61-6	1,2,3-Trichlorobenzene	ND		ug/L	2.22	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
96-18-4	1,2,3-Trichloropropane	ND		ug/L	2.73	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
120-82-1	1,2,4-Trichlorobenzene	ND		ug/L	1.38	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
95-63-6	1,2,4-Trimethylbenzene	**215**		ug/L	3.10	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
96-12-8	1,2-Dibromo-3-chloropropane	ND		ug/L	4.32	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-93-4	1,2-Dibromoethane	ND		ug/L	2.15	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-50-1	1,2-Dichlorobenzene	ND		ug/L	2.70	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-06-2	1,2-Dichloroethane	ND		ug/L	3.77	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-87-5	1,2-Dichloropropane	ND		ug/L	3.27	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-67-8	1,3,5-Trimethylbenzene	**54.7**		ug/L	3.47	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
541-73-1	1,3-Dichlorobenzene	ND		ug/L	2.83	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-46-7	1,4-Dichlorobenzene	ND		ug/L	3.11	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-93-3	2-Butanone	**70.9**	CCVE, ICVE, QL-02	ug/L	4.21	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: TS-01-GW-E2 **Sample ID:** 26C0140-02

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 12:45 pm	03/03/2026

VOA, 8260 LOW MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
591-78-6	2-Hexanone	ND		ug/L	3.20	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-10-1	4-Methyl-2-pentanone	**84.2**	CCVE, ICVE, QL-02	ug/L	3.65	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-64-1	Acetone	**326**	CAL-E	ug/L	33.5	50.0	25	EPA 8260D	03/05/2026 08:00	03/06/2026 02:42	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-02-8	Acrolein	ND	ICVE	ug/L	4.47	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-13-1	Acrylonitrile	ND		ug/L	4.22	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-43-2	Benzene	**558**		ug/L	2.79	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-97-5	Bromochloromethane	ND		ug/L	3.54	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
75-27-4	Bromodichloromethane	ND		ug/L	2.45	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-25-2	Bromoform	ND		ug/L	1.63	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-83-9	Bromomethane	ND	CCVE	ug/L	5.00	20.0	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-15-0	Carbon disulfide	ND		ug/L	3.62	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
56-23-5	Carbon tetrachloride	ND		ug/L	2.04	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-90-7	Chlorobenzene	ND		ug/L	2.84	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-00-3	Chloroethane	ND		ug/L	4.48	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-66-3	Chloroform	ND		ug/L	2.43	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-87-3	Chloromethane	ND	CCVE	ug/L	3.72	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-59-2	cis-1,2-Dichloroethylene	ND		ug/L	2.94	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-01-5	cis-1,3-Dichloropropylene	ND		ug/L	2.62	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
110-82-7	Cyclohexane	ND		ug/L	4.91	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
124-48-1	Dibromochloromethane	ND		ug/L	1.46	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-95-3	Dibromomethane	ND		ug/L	2.03	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		

Sample Information

Client Sample ID: TS-01-GW-E2 **Sample ID:** 26C0140-02

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 12:45 pm	03/03/2026

VOA, 8260 LOW MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-71-8	Dichlorodifluoromethane	ND	CCVE, ICVE	ug/L	4.51	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
100-41-4	Ethyl Benzene	**31.7**		ug/L	2.90	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-68-3	Hexachlorobutadiene	ND		ug/L	2.41	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	NYSDOH-NY12058,PADEP-68-04440		
98-82-8	Isopropylbenzene	**5.30**		ug/L	4.05	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-20-9	Methyl acetate	ND		ug/L	4.42	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
1634-04-4	Methyl tert-butyl ether (MTBE)	**387**		ug/L	2.44	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-87-2	Methylcyclohexane	ND		ug/L	4.77	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
75-09-2	Methylene chloride	**13.2**		ug/L	3.97	20.0	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
104-51-8	n-Butylbenzene	ND		ug/L	3.99	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
103-65-1	n-Propylbenzene	**13.2**		ug/L	3.84	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-47-6	o-Xylene	**117**		ug/L	2.61	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
179601-23-1	p- & m- Xylenes	**141**		ug/L	5.78	10.0	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
99-87-6	p-Isopropyltoluene	ND		ug/L	3.77	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
135-98-8	sec-Butylbenzene	ND		ug/L	4.44	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
100-42-5	Styrene	**12.8**		ug/L	2.55	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-65-0	tert-Butyl alcohol (TBA)	ND		ug/L	6.08	10.0	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
98-06-6	tert-Butylbenzene	ND		ug/L	3.67	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
127-18-4	Tetrachloroethylene	ND		ug/L	2.39	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-88-3	Toluene	**102**		ug/L	3.46	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-60-5	trans-1,2-Dichloroethylene	ND		ug/L	2.79	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-02-6	trans-1,3-Dichloropropylene	ND		ug/L	2.29	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: TS-01-GW-E2 **Sample ID:** 26C0140-02

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 12:45 pm	03/03/2026

VOA, 8260 LOW MASTER

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
79-01-6	Trichloroethylene	ND		ug/L	2.49	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-69-4	Trichlorofluoromethane	ND		ug/L	3.37	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-01-4	Vinyl Chloride	ND		ug/L	4.69	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
1330-20-7	Xylenes, Total	**258**		ug/L	8.39	15.0	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:22	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: SURR: 1,2-Dichloroethane-d4*	*108 %*	*69-130*
17060-07-0	*Surrogate: SURR: 1,2-Dichloroethane-d4*	*100 %*	*69-130*
2037-26-5	*Surrogate: SURR: Toluene-d8*	*100 %*	*81-117*
2037-26-5	*Surrogate: SURR: Toluene-d8*	*107 %*	*81-117*
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*108 %*	*79-122*
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*103 %*	*79-122*

SVOA, 8270 LOW MASTER

Log-in Notes:

Sample Notes: EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
92-52-4	1,1-Biphenyl	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	NYSDOH-NY10854,PADEP-68-04440		
122-66-7	1,2-Diphenylhydrazine (as Azobenzene)	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
58-90-2	2,3,4,6-Tetrachlorophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	NYSDOH-NY10854,PADEP-68-04440		
95-95-4	2,4,5-Trichlorophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
88-06-2	2,4,6-Trichlorophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
120-83-2	2,4-Dichlorophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
105-67-9	2,4-Dimethylphenol	**18.9**		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
51-28-5	* 2,4-Dinitrophenol	ND	CAL-E	ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005		
121-14-2	2,4-Dinitrotoluene	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
606-20-2	2,6-Dinitrotoluene	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		

Sample Information

Client Sample ID: TS-01-GW-E2 **Sample ID:** 26C0140-02

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 12:45 pm	03/03/2026

SVOA, 8270 LOW MASTER **Log-in Notes:** **Sample Notes:** EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
91-58-7	2-Chloronaphthalene	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
95-57-8	2-Chlorophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
91-57-6	2-Methylnaphthalene	**20.4**		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
95-48-7	2-Methylphenol	**8.34**		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
88-74-4	2-Nitroaniline	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
88-75-5	2-Nitrophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
65794-96-9	* 3- & 4-Methylphenols	**36.9**		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	CTDPH-PH-0840		
91-94-1	3,3-Dichlorobenzidine	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
99-09-2	3-Nitroaniline	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
534-52-1	4,6-Dinitro-2-methylphenol	ND	CAL-E	ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
101-55-3	4-Bromophenyl phenyl ether	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
59-50-7	4-Chloro-3-methylphenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
106-47-8	4-Chloroaniline	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
7005-72-3	4-Chlorophenyl phenyl ether	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
100-01-6	4-Nitroaniline	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
100-02-7	4-Nitrophenol	ND	QL-02	ug/L	5.00	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
98-86-2	Acetophenone	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
62-53-3	Aniline	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
100-52-7	Benzaldehyde	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
92-87-5	Benzidine	ND	CAL-E, CCVE	ug/L	5.00	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
65-85-0	Benzoic acid	**38.8**	QL-02	ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		

Sample Information

Client Sample ID: TS-01-GW-E2 **Sample ID:** 26C0140-02

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 12:45 pm	03/03/2026

SVOA, 8270 LOW MASTER **Log-in Notes:** **Sample Notes:** EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
100-51-6	Benzyl alcohol	**13.0**		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
85-68-7	Benzyl butyl phthalate	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
111-91-1	Bis(2-chloroethoxy)methane	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
111-44-4	Bis(2-chloroethyl)ether	ND		ug/L	1.00	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
108-60-1	Bis(2-chloroisopropyl)ether	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
105-60-2	Caprolactam	ND	ICVE	ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
86-74-8	Carbazole	**9.46**		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
132-64-9	Dibenzofuran	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
84-66-2	Diethyl phthalate	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
131-11-3	Dimethyl phthalate	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
84-74-2	Di-n-butyl phthalate	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
117-84-0	Di-n-octyl phthalate	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
122-39-4	Diphenylamine	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	NYSDOH-NY10854,PADEP-68-04440		
77-47-4	Hexachlorocyclopentadiene	ND	CAL-E	ug/L	5.00	10.0	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
78-59-1	Isophorone	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
621-64-7	N-nitroso-di-n-propylamine	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
86-30-6	N-Nitrosodiphenylamine	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
108-95-2	Phenol	**28.0**		ug/L	0.750	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
110-86-1	Pyridine	ND	QL-02	ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 22:36	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		

	Surrogate Recoveries	Result		Acceptance Range
367-12-4	*Surrogate: SURR: 2-Fluorophenol*	*18.9 %*	S-08	*19.7-63.1*
13127-88-3	*Surrogate: SURR: Phenol-d6*	*12.2 %*		*10.1-41.7*
4165-60-0	*Surrogate: SURR: Nitrobenzene-d5*	*34.2 %*	S-08	*50.2-113*
321-60-8	*Surrogate: SURR: 2-Fluorobiphenyl*	*30.6 %*	S-08	*39.9-105*

Sample Information

Client Sample ID: TS-01-GW-E2 **Sample ID:** 26C0140-02

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 12:45 pm	03/03/2026

SVOA, 8270 LOW MASTER

Log-in Notes: **Sample Notes:** EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
118-79-6	*Surrogate: SURR: 2,4,6-Tribromophenol*	*36.3 %*	S-08		*39.3-151*						
1718-51-0	*Surrogate: SURR: Terphenyl-d14*	*38.9 %*			*30.7-106*						

SVOA, 8270 SIM MASTER

Log-in Notes: **Sample Notes:** EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	**4.76**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:47	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
208-96-8	Acenaphthylene	**0.303**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:47	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
120-12-7	* Anthracene	**3.68**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:47	SR
								Certifications:			
1912-24-9	* Atrazine	ND		ug/L	0.500	0.500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:47	SR
								Certifications:			
56-55-3	Benzo(a)anthracene	**1.17**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:47	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
50-32-8	Benzo(a)pyrene	**0.547**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:47	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
205-99-2	Benzo(b)fluoranthene	**0.691**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:47	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
191-24-2	Benzo(g,h,i)perylene	**0.295**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:47	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
207-08-9	Benzo(k)fluoranthene	**0.676**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:47	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
117-81-7	* Bis(2-ethylhexyl)phthalate	**1.53**		ug/L	0.500	0.500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:47	SR
								Certifications:			
218-01-9	Chrysene	**0.766**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:47	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
53-70-3	Dibenzo(a,h)anthracene	**0.129**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:47	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
206-44-0	Fluoranthene	**2.84**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:47	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
86-73-7	Fluorene	**3.51**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:47	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
118-74-1	* Hexachlorobenzene	ND		ug/L	0.0200	0.0200	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:47	SR
								Certifications:			
87-68-3	* Hexachlorobutadiene	ND	QL-02	ug/L	0.500	0.500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:47	SR
								Certifications:			
67-72-1	* Hexachloroethane	ND		ug/L	0.500	0.500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:47	SR
								Certifications:			

Sample Information

Client Sample ID: TS-01-GW-E2 **Sample ID:** 26C0140-02

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 12:45 pm	03/03/2026

SVOA, 8270 SIM MASTER

Log-in Notes:

Sample Notes: EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
193-39-5	Indeno(1,2,3-cd)pyrene	**0.261**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:47	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
91-20-3	Naphthalene	**82.3**		ug/L	5.00	5.00	100	EPA 8270E SIM	03/05/2026 10:21	03/10/2026 13:33	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
98-95-3	* Nitrobenzene	ND	ICVE	ug/L	0.250	0.250	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:47	SR
								Certifications:			
62-75-9	* N-Nitrosodimethylamine	ND	QL-02	ug/L	0.500	0.500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:47	SR
								Certifications:			
87-86-5	* Pentachlorophenol	**0.868**		ug/L	0.250	0.250	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:47	SR
								Certifications:			
85-01-8	Phenanthrene	**8.69**		ug/L	0.500	0.500	10	EPA 8270E SIM	03/05/2026 10:21	03/09/2026 16:58	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
129-00-0	Pyrene	**2.57**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 15:47	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			

Total Organic Carbon

Log-in Notes:

Sample Notes:

Sample Prepared by Method: Analysis Preparation

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
TOC	Total Organic Carbon (TOC)	**9330**		mg/L	50.0	50.0	50	SM 5310B-2014	03/05/2026 14:19	03/09/2026 09:37	JAMT
								Certifications: NYSDOH-NY10854,CTDPH-PH-0840,NJDEP-CT005,PADEP-68-0			

Sample Information

Client Sample ID: TS-01-GW-E3 **Sample ID:** 26C0140-03

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 1:00 pm	03/03/2026

VOA, 8260 LOW MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND		ug/L	2.16	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-55-6	1,1,1-Trichloroethane	ND		ug/L	2.66	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-34-5	1,1,2,2-Tetrachloroethane	ND		ug/L	2.56	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		ug/L	2.86	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-00-5	1,1,2-Trichloroethane	ND		ug/L	2.49	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-34-3	1,1-Dichloroethane	ND		ug/L	2.72	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-35-4	1,1-Dichloroethylene	ND		ug/L	3.27	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-61-6	1,2,3-Trichlorobenzene	ND		ug/L	2.22	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
96-18-4	1,2,3-Trichloropropane	ND		ug/L	2.73	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
120-82-1	1,2,4-Trichlorobenzene	ND		ug/L	1.38	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
95-63-6	1,2,4-Trimethylbenzene	**186**		ug/L	3.10	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
96-12-8	1,2-Dibromo-3-chloropropane	ND		ug/L	4.32	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-93-4	1,2-Dibromoethane	ND		ug/L	2.15	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-50-1	1,2-Dichlorobenzene	ND		ug/L	2.70	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-06-2	1,2-Dichloroethane	ND		ug/L	3.77	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-87-5	1,2-Dichloropropane	ND		ug/L	3.27	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-67-8	1,3,5-Trimethylbenzene	**48.5**		ug/L	3.47	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
541-73-1	1,3-Dichlorobenzene	ND		ug/L	2.83	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-46-7	1,4-Dichlorobenzene	ND		ug/L	3.11	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-93-3	2-Butanone	**56.0**	CCVE, ICVE, QL-02	ug/L	4.21	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: TS-01-GW-E3 **Sample ID:** 26C0140-03

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 1:00 pm	03/03/2026

VOA, 8260 LOW MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
591-78-6	2-Hexanone	ND		ug/L	3.20	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-10-1	4-Methyl-2-pentanone	**76.3**	CCVE, ICVE, QL-02	ug/L	3.65	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-64-1	Acetone	**232**	CAL-E	ug/L	33.5	50.0	25	EPA 8260D	03/05/2026 08:00	03/06/2026 03:12	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-02-8	Acrolein	ND	ICVE	ug/L	4.47	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-13-1	Acrylonitrile	ND		ug/L	4.22	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-43-2	Benzene	**760**		ug/L	2.79	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-97-5	Bromochloromethane	ND		ug/L	3.54	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
75-27-4	Bromodichloromethane	ND		ug/L	2.45	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-25-2	Bromoform	ND		ug/L	1.63	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-83-9	Bromomethane	ND	CCVE	ug/L	5.00	20.0	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-15-0	Carbon disulfide	ND		ug/L	3.62	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
56-23-5	Carbon tetrachloride	ND		ug/L	2.04	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-90-7	Chlorobenzene	ND		ug/L	2.84	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-00-3	Chloroethane	ND		ug/L	4.48	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-66-3	Chloroform	ND		ug/L	2.43	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-87-3	Chloromethane	ND	CCVE	ug/L	3.72	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-59-2	cis-1,2-Dichloroethylene	ND		ug/L	2.94	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-01-5	cis-1,3-Dichloropropylene	ND		ug/L	2.62	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
110-82-7	Cyclohexane	ND		ug/L	4.91	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
124-48-1	Dibromochloromethane	ND		ug/L	1.46	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-95-3	Dibromomethane	ND		ug/L	2.03	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		

Sample Information

Client Sample ID: TS-01-GW-E3 **Sample ID:** 26C0140-03

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 1:00 pm	03/03/2026

VOA, 8260 LOW MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-71-8	Dichlorodifluoromethane	ND	CCVE, ICVE	ug/L	4.51	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
100-41-4	Ethyl Benzene	**29.2**		ug/L	2.90	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-68-3	Hexachlorobutadiene	ND		ug/L	2.41	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	NYSDOH-NY12058,PADEP-68-04440		
98-82-8	Isopropylbenzene	**4.40**		ug/L	4.05	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-20-9	Methyl acetate	ND		ug/L	4.42	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
1634-04-4	Methyl tert-butyl ether (MTBE)	**403**		ug/L	2.44	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-87-2	Methylcyclohexane	ND		ug/L	4.77	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
75-09-2	Methylene chloride	**12.5**		ug/L	3.97	20.0	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
104-51-8	n-Butylbenzene	ND		ug/L	3.99	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
103-65-1	n-Propylbenzene	**11.1**		ug/L	3.84	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-47-6	o-Xylene	**110**		ug/L	2.61	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
179601-23-1	p- & m- Xylenes	**131**		ug/L	5.78	10.0	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
99-87-6	p-Isopropyltoluene	ND		ug/L	3.77	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
135-98-8	sec-Butylbenzene	ND		ug/L	4.44	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
100-42-5	Styrene	**10.9**		ug/L	2.55	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-65-0	tert-Butyl alcohol (TBA)	ND		ug/L	6.08	10.0	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
98-06-6	tert-Butylbenzene	ND		ug/L	3.67	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
127-18-4	Tetrachloroethylene	ND		ug/L	2.39	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-88-3	Toluene	**114**		ug/L	3.46	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-60-5	trans-1,2-Dichloroethylene	ND		ug/L	2.79	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-02-6	trans-1,3-Dichloropropylene	ND		ug/L	2.29	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: TS-01-GW-E3 **Sample ID:** 26C0140-03

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 1:00 pm	03/03/2026

VOA, 8260 LOW MASTER

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
79-01-6	Trichloroethylene	ND		ug/L	2.49	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-69-4	Trichlorofluoromethane	ND		ug/L	3.37	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-01-4	Vinyl Chloride	ND		ug/L	4.69	5.00	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
1330-20-7	Xylenes, Total	**242**		ug/L	8.39	15.0	10	EPA 8260D	03/04/2026 08:00	03/04/2026 13:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: SURR: 1,2-Dichloroethane-d4*	*99.6 %*	*69-130*
17060-07-0	*Surrogate: SURR: 1,2-Dichloroethane-d4*	*109 %*	*69-130*
2037-26-5	*Surrogate: SURR: Toluene-d8*	*109 %*	*81-117*
2037-26-5	*Surrogate: SURR: Toluene-d8*	*100 %*	*81-117*
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*103 %*	*79-122*
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*106 %*	*79-122*

SVOA, 8270 LOW MASTER

Log-in Notes:

Sample Notes: EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
92-52-4	1,1-Biphenyl	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	NYSDOH-NY10854,PADEP-68-04440		
122-66-7	1,2-Diphenylhydrazine (as Azobenzene)	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
58-90-2	2,3,4,6-Tetrachlorophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	NYSDOH-NY10854,PADEP-68-04440		
95-95-4	2,4,5-Trichlorophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
88-06-2	2,4,6-Trichlorophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
120-83-2	2,4-Dichlorophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
105-67-9	2,4-Dimethylphenol	**26.3**		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
51-28-5	* 2,4-Dinitrophenol	ND	CAL-E	ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005		
121-14-2	2,4-Dinitrotoluene	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
606-20-2	2,6-Dinitrotoluene	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		

Sample Information

Client Sample ID: TS-01-GW-E3 **Sample ID:** 26C0140-03

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 1:00 pm	03/03/2026

SVOA, 8270 LOW MASTER **Log-in Notes:** **Sample Notes:** EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
91-58-7	2-Chloronaphthalene	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
95-57-8	2-Chlorophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
91-57-6	2-Methylnaphthalene	**26.5**		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
95-48-7	2-Methylphenol	**10.6**		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
88-74-4	2-Nitroaniline	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
88-75-5	2-Nitrophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
65794-96-9	* 3- & 4-Methylphenols	**36.4**		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	CTDPH-PH-0840		
91-94-1	3,3-Dichlorobenzidine	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
99-09-2	3-Nitroaniline	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
534-52-1	4,6-Dinitro-2-methylphenol	ND	CAL-E	ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
101-55-3	4-Bromophenyl phenyl ether	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
59-50-7	4-Chloro-3-methylphenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
106-47-8	4-Chloroaniline	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
7005-72-3	4-Chlorophenyl phenyl ether	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
100-01-6	4-Nitroaniline	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
100-02-7	4-Nitrophenol	ND	QL-02	ug/L	5.00	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
98-86-2	Acetophenone	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
62-53-3	Aniline	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
100-52-7	Benzaldehyde	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
92-87-5	Benzidine	ND	CAL-E, CCVE	ug/L	5.00	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
65-85-0	Benzoic acid	**33.8**	QL-02	ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		

Sample Information

Client Sample ID: TS-01-GW-E3 **Sample ID:** 26C0140-03

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 1:00 pm	03/03/2026

SVOA, 8270 LOW MASTER **Log-in Notes:** **Sample Notes:** EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
100-51-6	Benzyl alcohol	**12.5**		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
85-68-7	Benzyl butyl phthalate	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
111-91-1	Bis(2-chloroethoxy)methane	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
111-44-4	Bis(2-chloroethyl)ether	ND		ug/L	1.00	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
108-60-1	Bis(2-chloroisopropyl)ether	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
105-60-2	Caprolactam	ND	ICVE	ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
86-74-8	Carbazole	**7.55**		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
132-64-9	Dibenzofuran	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
84-66-2	Diethyl phthalate	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
131-11-3	Dimethyl phthalate	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
84-74-2	Di-n-butyl phthalate	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
117-84-0	Di-n-octyl phthalate	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
122-39-4	Diphenylamine	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	NYSDOH-NY10854,PADEP-68-04440		
77-47-4	Hexachlorocyclopentadiene	ND	CAL-E	ug/L	5.00	10.0	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
78-59-1	Isophorone	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
621-64-7	N-nitroso-di-n-propylamine	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
86-30-6	N-Nitrosodiphenylamine	ND		ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
108-95-2	Phenol	**24.4**		ug/L	0.750	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
110-86-1	Pyridine	ND	QL-02	ug/L	2.50	5.00	1	EPA 8270E	03/05/2026 10:18	03/05/2026 23:11	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		

	Surrogate Recoveries	Result		Acceptance Range
367-12-4	*Surrogate: SURR: 2-Fluorophenol*	*13.8 %*	S-08	*19.7-63.1*
13127-88-3	*Surrogate: SURR: Phenol-d6*	*8.72 %*	S-08	*10.1-41.7*
4165-60-0	*Surrogate: SURR: Nitrobenzene-d5*	*24.9 %*	S-08	*50.2-113*
321-60-8	*Surrogate: SURR: 2-Fluorobiphenyl*	*23.8 %*	S-08	*39.9-105*

Sample Information

Client Sample ID: TS-01-GW-E3 **Sample ID:** 26C0140-03

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 1:00 pm	03/03/2026

SVOA, 8270 LOW MASTER

Log-in Notes: **Sample Notes:** EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
118-79-6	*Surrogate: SURR: 2,4,6-Tribromophenol*	*28.2 %*	S-08		*39.3-151*						
1718-51-0	*Surrogate: SURR: Terphenyl-d14*	*28.2 %*	S-08		*30.7-106*						

SVOA, 8270 SIM MASTER

Log-in Notes: **Sample Notes:** EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	**3.51**		ug/L	0.0500	0.0500	1	EPA 8270E SIM Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005	03/05/2026 10:21	03/06/2026 16:18	SR
208-96-8	Acenaphthylene	**0.486**		ug/L	0.0500	0.0500	1	EPA 8270E SIM Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005	03/05/2026 10:21	03/06/2026 16:18	SR
120-12-7	* Anthracene	**3.06**		ug/L	0.0500	0.0500	1	EPA 8270E SIM Certifications:	03/05/2026 10:21	03/06/2026 16:18	SR
1912-24-9	* Atrazine	ND		ug/L	0.500	0.500	1	EPA 8270E SIM Certifications:	03/05/2026 10:21	03/06/2026 16:18	SR
56-55-3	Benzo(a)anthracene	**1.72**		ug/L	0.0500	0.0500	1	EPA 8270E SIM Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005	03/05/2026 10:21	03/06/2026 16:18	SR
50-32-8	Benzo(a)pyrene	**1.20**		ug/L	0.0500	0.0500	1	EPA 8270E SIM Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005	03/05/2026 10:21	03/06/2026 16:18	SR
205-99-2	Benzo(b)fluoranthene	**1.21**		ug/L	0.0500	0.0500	1	EPA 8270E SIM Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005	03/05/2026 10:21	03/06/2026 16:18	SR
191-24-2	Benzo(g,h,i)perylene	**0.640**		ug/L	0.0500	0.0500	1	EPA 8270E SIM Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005	03/05/2026 10:21	03/06/2026 16:18	SR
207-08-9	Benzo(k)fluoranthene	**1.23**		ug/L	0.0500	0.0500	1	EPA 8270E SIM Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005	03/05/2026 10:21	03/06/2026 16:18	SR
117-81-7	* Bis(2-ethylhexyl)phthalate	**3.59**		ug/L	0.500	0.500	1	EPA 8270E SIM Certifications:	03/05/2026 10:21	03/06/2026 16:18	SR
218-01-9	Chrysene	**1.53**		ug/L	0.0500	0.0500	1	EPA 8270E SIM Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005	03/05/2026 10:21	03/06/2026 16:18	SR
53-70-3	Dibenzo(a,h)anthracene	**0.276**		ug/L	0.0500	0.0500	1	EPA 8270E SIM Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005	03/05/2026 10:21	03/06/2026 16:18	SR
206-44-0	Fluoranthene	**4.72**		ug/L	0.0500	0.0500	1	EPA 8270E SIM Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005	03/05/2026 10:21	03/06/2026 16:18	SR
86-73-7	Fluorene	**3.23**		ug/L	0.0500	0.0500	1	EPA 8270E SIM Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005	03/05/2026 10:21	03/06/2026 16:18	SR
118-74-1	* Hexachlorobenzene	ND		ug/L	0.0200	0.0200	1	EPA 8270E SIM Certifications:	03/05/2026 10:21	03/06/2026 16:18	SR
87-68-3	* Hexachlorobutadiene	ND	QL-02	ug/L	0.500	0.500	1	EPA 8270E SIM Certifications:	03/05/2026 10:21	03/06/2026 16:18	SR
67-72-1	* Hexachloroethane	ND		ug/L	0.500	0.500	1	EPA 8270E SIM Certifications:	03/05/2026 10:21	03/06/2026 16:18	SR

Sample Information

Client Sample ID: TS-01-GW-E3 **Sample ID:** 26C0140-03

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 1:00 pm	03/03/2026

SVOA, 8270 SIM MASTER

Log-in Notes:

Sample Notes: EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
193-39-5	Indeno(1,2,3-cd)pyrene	**0.574**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 16:18	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
91-20-3	Naphthalene	**166**		ug/L	5.00	5.00	100	EPA 8270E SIM	03/05/2026 10:21	03/09/2026 17:29	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
98-95-3	* Nitrobenzene	ND	ICVE	ug/L	0.250	0.250	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 16:18	SR
								Certifications:			
62-75-9	* N-Nitrosodimethylamine	ND	QL-02	ug/L	0.500	0.500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 16:18	SR
								Certifications:			
87-86-5	* Pentachlorophenol	ND		ug/L	0.250	0.250	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 16:18	SR
								Certifications:			
85-01-8	Phenanthrene	**7.85**		ug/L	5.00	5.00	100	EPA 8270E SIM	03/05/2026 10:21	03/09/2026 17:29	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
129-00-0	Pyrene	**4.04**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/05/2026 10:21	03/06/2026 16:18	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			

Total Organic Carbon

Log-in Notes:

Sample Notes:

Sample Prepared by Method: Analysis Preparation

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
TOC	Total Organic Carbon (TOC)	**8950**		mg/L	50.0	50.0	50	SM 5310B-2014	03/05/2026 14:19	03/09/2026 09:37	JAMT
								Certifications: NYSDOH-NY10854,CTDPH-PH-0840,NJDEP-CT005,PADEP-68-0			

Sample Information

Client Sample ID: TS-01-GW-E4 **Sample ID:** 26C0140-04

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 1:15 pm	03/03/2026

VOA, 8260 LOW MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND		ug/L	1.08	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-55-6	1,1,1-Trichloroethane	ND		ug/L	1.33	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-34-5	1,1,2,2-Tetrachloroethane	ND		ug/L	1.28	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		ug/L	1.43	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-00-5	1,1,2-Trichloroethane	ND		ug/L	1.24	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-34-3	1,1-Dichloroethane	ND		ug/L	1.36	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-35-4	1,1-Dichloroethylene	ND		ug/L	1.64	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-61-6	1,2,3-Trichlorobenzene	ND		ug/L	1.11	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
96-18-4	1,2,3-Trichloropropane	ND		ug/L	1.36	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
120-82-1	1,2,4-Trichlorobenzene	ND		ug/L	0.690	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
95-63-6	1,2,4-Trimethylbenzene	**18.8**		ug/L	1.55	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
96-12-8	1,2-Dibromo-3-chloropropane	ND		ug/L	2.16	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-93-4	1,2-Dibromoethane	ND		ug/L	1.08	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-50-1	1,2-Dichlorobenzene	ND		ug/L	1.35	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-06-2	1,2-Dichloroethane	ND		ug/L	1.88	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-87-5	1,2-Dichloropropane	ND		ug/L	1.64	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-67-8	1,3,5-Trimethylbenzene	**4.90**		ug/L	1.74	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
541-73-1	1,3-Dichlorobenzene	ND		ug/L	1.42	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-46-7	1,4-Dichlorobenzene	ND		ug/L	1.56	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-93-3	2-Butanone	**72.3**	CCVE, ICVE, QL-02	ug/L	2.10	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: TS-01-GW-E4 **Sample ID:** 26C0140-04

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 1:15 pm	03/03/2026

VOA, 8260 LOW MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
591-78-6	2-Hexanone	ND		ug/L	1.60	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-10-1	4-Methyl-2-pentanone	**17.2**	CCVE, ICVE, QL-02	ug/L	1.82	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-64-1	Acetone	**606**	CAL-E	ug/L	33.5	50.0	25	EPA 8260D	03/05/2026 08:00	03/06/2026 00:43	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-02-8	Acrolein	ND	ICVE	ug/L	2.24	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-13-1	Acrylonitrile	ND		ug/L	2.11	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-43-2	Benzene	**25.2**		ug/L	1.40	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-97-5	Bromochloromethane	ND		ug/L	1.77	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
75-27-4	Bromodichloromethane	ND		ug/L	1.22	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-25-2	Bromoform	ND		ug/L	0.815	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-83-9	Bromomethane	ND	CCVE	ug/L	2.50	10.0	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-15-0	Carbon disulfide	**2.95**		ug/L	1.81	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
56-23-5	Carbon tetrachloride	ND		ug/L	1.02	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-90-7	Chlorobenzene	ND		ug/L	1.42	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-00-3	Chloroethane	ND		ug/L	2.24	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-66-3	Chloroform	ND		ug/L	1.22	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-87-3	Chloromethane	ND	CCVE	ug/L	1.86	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-59-2	cis-1,2-Dichloroethylene	ND		ug/L	1.47	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-01-5	cis-1,3-Dichloropropylene	ND		ug/L	1.31	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
110-82-7	Cyclohexane	ND		ug/L	2.46	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
124-48-1	Dibromochloromethane	ND		ug/L	0.730	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-95-3	Dibromomethane	ND		ug/L	1.02	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		

Sample Information

Client Sample ID: TS-01-GW-E4 **Sample ID:** 26C0140-04

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 1:15 pm	03/03/2026

VOA, 8260 LOW MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-71-8	Dichlorodifluoromethane	ND	ICVE, CCVE	ug/L	2.26	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
100-41-4	Ethyl Benzene	**2.40**		ug/L	1.45	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-68-3	Hexachlorobutadiene	ND		ug/L	1.20	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	NYSDOH-NY12058,PADEP-68-04440		
98-82-8	Isopropylbenzene	ND		ug/L	2.02	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-20-9	Methyl acetate	ND		ug/L	2.21	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
1634-04-4	Methyl tert-butyl ether (MTBE)	**24.4**		ug/L	1.22	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-87-2	Methylcyclohexane	ND		ug/L	2.38	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
75-09-2	Methylene chloride	**4.35**		ug/L	1.98	10.0	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
104-51-8	n-Butylbenzene	ND		ug/L	2.00	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
103-65-1	n-Propylbenzene	ND		ug/L	1.92	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-47-6	o-Xylene	**9.00**		ug/L	1.30	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
179601-23-1	p- & m- Xylenes	**11.0**		ug/L	2.89	5.00	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
99-87-6	p-Isopropyltoluene	ND		ug/L	1.88	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
135-98-8	sec-Butylbenzene	ND		ug/L	2.22	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
100-42-5	Styrene	ND		ug/L	1.28	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-65-0	tert-Butyl alcohol (TBA)	ND		ug/L	3.04	5.00	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
98-06-6	tert-Butylbenzene	ND		ug/L	1.84	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
127-18-4	Tetrachloroethylene	ND		ug/L	1.20	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-88-3	Toluene	**7.95**		ug/L	1.73	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-60-5	trans-1,2-Dichloroethylene	ND		ug/L	1.40	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-02-6	trans-1,3-Dichloropropylene	ND		ug/L	1.14	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: TS-01-GW-E4 **Sample ID:** 26C0140-04

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 1:15 pm	03/03/2026

VOA, 8260 LOW MASTER

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
79-01-6	Trichloroethylene	ND		ug/L	1.24	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-69-4	Trichlorofluoromethane	ND		ug/L	1.68	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-01-4	Vinyl Chloride	ND		ug/L	2.34	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
1330-20-7	Xylenes, Total	**20.0**		ug/L	4.20	7.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:25	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: SURR: 1,2-Dichloroethane-d4*	*109 %*	*69-130*
17060-07-0	*Surrogate: SURR: 1,2-Dichloroethane-d4*	*101 %*	*69-130*
2037-26-5	*Surrogate: SURR: Toluene-d8*	*109 %*	*81-117*
2037-26-5	*Surrogate: SURR: Toluene-d8*	*101 %*	*81-117*
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*109 %*	*79-122*
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*105 %*	*79-122*

SVOA, 8270 LOW MASTER

Log-in Notes:

Sample Notes: EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
92-52-4	1,1-Biphenyl	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	NYSDOH-NY10854,PADEP-68-04440		
122-66-7	1,2-Diphenylhydrazine (as Azobenzene)	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
58-90-2	2,3,4,6-Tetrachlorophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	NYSDOH-NY10854,PADEP-68-04440		
95-95-4	2,4,5-Trichlorophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
88-06-2	2,4,6-Trichlorophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
120-83-2	2,4-Dichlorophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
105-67-9	2,4-Dimethylphenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
51-28-5	* 2,4-Dinitrophenol	ND	CAL-E	ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005		
121-14-2	2,4-Dinitrotoluene	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
606-20-2	2,6-Dinitrotoluene	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		

Sample Information

Client Sample ID: TS-01-GW-E4 **Sample ID:** 26C0140-04

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 1:15 pm	03/03/2026

SVOA, 8270 LOW MASTER **Log-in Notes:** **Sample Notes:** EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
91-58-7	2-Chloronaphthalene	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
95-57-8	2-Chlorophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
91-57-6	2-Methylnaphthalene	**4.98**	J	ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
95-48-7	2-Methylphenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
88-74-4	2-Nitroaniline	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
88-75-5	2-Nitrophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
65794-96-9	* 3- & 4-Methylphenols	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	CTDPH-PH-0840		
91-94-1	3,3-Dichlorobenzidine	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
99-09-2	3-Nitroaniline	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
534-52-1	4,6-Dinitro-2-methylphenol	ND	CAL-E	ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
101-55-3	4-Bromophenyl phenyl ether	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
59-50-7	4-Chloro-3-methylphenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
106-47-8	4-Chloroaniline	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
7005-72-3	4-Chlorophenyl phenyl ether	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
100-01-6	4-Nitroaniline	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
100-02-7	4-Nitrophenol	ND		ug/L	5.00	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
98-86-2	Acetophenone	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
62-53-3	Aniline	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
100-52-7	Benzaldehyde	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
92-87-5	Benzidine	ND	CAL-E, CCVE	ug/L	5.00	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
65-85-0	Benzoic acid	**94.4**		ug/L	25.0	50.0	10	EPA 8270E	03/04/2026 14:00	03/05/2026 10:49	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		

Sample Information

Client Sample ID: TS-01-GW-E4 **Sample ID:** 26C0140-04

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 1:15 pm	03/03/2026

SVOA, 8270 LOW MASTER **Log-in Notes:** **Sample Notes:** EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
100-51-6	Benzyl alcohol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
85-68-7	Benzyl butyl phthalate	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
111-91-1	Bis(2-chloroethoxy)methane	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
111-44-4	Bis(2-chloroethyl)ether	ND		ug/L	1.00	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
108-60-1	Bis(2-chloroisopropyl)ether	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
105-60-2	Caprolactam	ND	ICVE	ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
86-74-8	Carbazole	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
132-64-9	Dibenzofuran	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
84-66-2	Diethyl phthalate	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
131-11-3	Dimethyl phthalate	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
84-74-2	Di-n-butyl phthalate	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
117-84-0	Di-n-octyl phthalate	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
122-39-4	Diphenylamine	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	NYSDOH-NY10854,PADEP-68-04440		
77-47-4	Hexachlorocyclopentadiene	ND	CAL-E	ug/L	5.00	10.0	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
78-59-1	Isophorone	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
621-64-7	N-nitroso-di-n-propylamine	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
86-30-6	N-Nitrosodiphenylamine	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
108-95-2	Phenol	ND		ug/L	0.750	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
110-86-1	Pyridine	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 02:32	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		

	Surrogate Recoveries	Result		Acceptance Range
367-12-4	*Surrogate: SURR: 2-Fluorophenol*	*18.6 %*	S-08	*19.7-63.1*
13127-88-3	*Surrogate: SURR: Phenol-d6*	*10.9 %*		*10.1-41.7*
4165-60-0	*Surrogate: SURR: Nitrobenzene-d5*	*36.9 %*	S-08	*50.2-113*
321-60-8	*Surrogate: SURR: 2-Fluorobiphenyl*	*38.0 %*	S-08	*39.9-105*

Sample Information

Client Sample ID: TS-01-GW-E4 **Sample ID:** 26C0140-04

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 1:15 pm	03/03/2026

SVOA, 8270 LOW MASTER

Log-in Notes: **Sample Notes:** EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
118-79-6	*Surrogate: SURR: 2,4,6-Tribromophenol*	*44.1 %*			*39.3-151*						
1718-51-0	*Surrogate: SURR: Terphenyl-d14*	*47.4 %*			*30.7-106*						

SVOA, 8270 SIM MASTER

Log-in Notes: **Sample Notes:** EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	**0.876**		ug/L	0.0500	0.0500	1	EPA 8270E SIM Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005	03/04/2026 14:05	03/05/2026 12:25	SR
208-96-8	Acenaphthylene	**0.243**		ug/L	0.0500	0.0500	1	EPA 8270E SIM Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005	03/04/2026 14:05	03/05/2026 12:25	SR
120-12-7	* Anthracene	**0.682**		ug/L	0.0500	0.0500	1	EPA 8270E SIM Certifications:	03/04/2026 14:05	03/05/2026 12:25	SR
1912-24-9	* Atrazine	ND		ug/L	0.500	0.500	1	EPA 8270E SIM Certifications:	03/04/2026 14:05	03/05/2026 12:25	SR
56-55-3	Benzo(a)anthracene	**1.43**		ug/L	0.0500	0.0500	1	EPA 8270E SIM Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005	03/04/2026 14:05	03/05/2026 12:25	SR
50-32-8	Benzo(a)pyrene	**0.685**		ug/L	0.0500	0.0500	1	EPA 8270E SIM Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005	03/04/2026 14:05	03/05/2026 12:25	SR
205-99-2	Benzo(b)fluoranthene	**0.928**		ug/L	0.0500	0.0500	1	EPA 8270E SIM Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005	03/04/2026 14:05	03/05/2026 12:25	SR
191-24-2	Benzo(g,h,i)perylene	**0.551**		ug/L	0.0500	0.0500	1	EPA 8270E SIM Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005	03/04/2026 14:05	03/05/2026 12:25	SR
207-08-9	Benzo(k)fluoranthene	**0.932**		ug/L	0.0500	0.0500	1	EPA 8270E SIM Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005	03/04/2026 14:05	03/05/2026 12:25	SR
117-81-7	* Bis(2-ethylhexyl)phthalate	**2.65**	CCVE	ug/L	0.500	0.500	1	EPA 8270E SIM Certifications:	03/04/2026 14:05	03/05/2026 12:25	SR
218-01-9	Chrysene	**1.45**		ug/L	0.0500	0.0500	1	EPA 8270E SIM Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005	03/04/2026 14:05	03/05/2026 12:25	SR
53-70-3	Dibenzo(a,h)anthracene	**0.139**		ug/L	0.0500	0.0500	1	EPA 8270E SIM Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005	03/04/2026 14:05	03/05/2026 12:25	SR
206-44-0	Fluoranthene	**4.49**		ug/L	0.0500	0.0500	1	EPA 8270E SIM Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005	03/04/2026 14:05	03/05/2026 12:25	SR
86-73-7	Fluorene	**1.26**		ug/L	0.0500	0.0500	1	EPA 8270E SIM Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005	03/04/2026 14:05	03/05/2026 12:25	SR
118-74-1	* Hexachlorobenzene	ND		ug/L	0.0200	0.0200	1	EPA 8270E SIM Certifications:	03/04/2026 14:05	03/05/2026 12:25	SR
87-68-3	* Hexachlorobutadiene	ND		ug/L	0.500	0.500	1	EPA 8270E SIM Certifications:	03/04/2026 14:05	03/05/2026 12:25	SR
67-72-1	* Hexachloroethane	ND		ug/L	0.500	0.500	1	EPA 8270E SIM Certifications:	03/04/2026 14:05	03/05/2026 12:25	SR

Sample Information

Client Sample ID: TS-01-GW-E4 **Sample ID:** 26C0140-04

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 1:15 pm	03/03/2026

SVOA, 8270 SIM MASTER

Log-in Notes:

Sample Notes: EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
193-39-5	Indeno(1,2,3-cd)pyrene	**0.496**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 12:25	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
91-20-3	Naphthalene	**37.6**		ug/L	0.500	0.500	10	EPA 8270E SIM	03/04/2026 14:05	03/09/2026 18:00	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
98-95-3	* Nitrobenzene	ND	ICVE, CCVE	ug/L	0.250	0.250	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 12:25	SR
								Certifications:			
62-75-9	* N-Nitrosodimethylamine	ND		ug/L	0.500	0.500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 12:25	SR
								Certifications:			
87-86-5	* Pentachlorophenol	ND	CCVE	ug/L	0.250	0.250	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 12:25	SR
								Certifications:			
85-01-8	Phenanthrene	**5.61**		ug/L	0.500	0.500	10	EPA 8270E SIM	03/04/2026 14:05	03/09/2026 18:00	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
129-00-0	Pyrene	**2.85**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 12:25	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			

Total Organic Carbon

Log-in Notes:

Sample Notes:

Sample Prepared by Method: Analysis Preparation

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
TOC	Total Organic Carbon (TOC)	**8790**		mg/L	50.0	50.0	50	SM 5310B-2014	03/05/2026 14:19	03/09/2026 09:37	JAMT
								Certifications: NYSDOH-NY10854,CTDPH-PH-0840,NJDEP-CT005,PADEP-68-0			

Sample Information

Client Sample ID: TS-01-GW-E5 **Sample ID:** 26C0140-05

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 1:30 pm	03/03/2026

VOA, 8260 LOW MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND		ug/L	1.08	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-55-6	1,1,1-Trichloroethane	ND		ug/L	1.33	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-34-5	1,1,2,2-Tetrachloroethane	ND		ug/L	1.28	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		ug/L	1.43	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-00-5	1,1,2-Trichloroethane	ND		ug/L	1.24	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-34-3	1,1-Dichloroethane	ND		ug/L	1.36	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-35-4	1,1-Dichloroethylene	ND		ug/L	1.64	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-61-6	1,2,3-Trichlorobenzene	ND		ug/L	1.11	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
96-18-4	1,2,3-Trichloropropane	ND		ug/L	1.36	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
120-82-1	1,2,4-Trichlorobenzene	ND		ug/L	0.690	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
95-63-6	1,2,4-Trimethylbenzene	**16.8**		ug/L	1.55	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
96-12-8	1,2-Dibromo-3-chloropropane	ND		ug/L	2.16	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-93-4	1,2-Dibromoethane	ND		ug/L	1.08	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-50-1	1,2-Dichlorobenzene	ND		ug/L	1.35	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-06-2	1,2-Dichloroethane	ND		ug/L	1.88	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-87-5	1,2-Dichloropropane	ND		ug/L	1.64	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-67-8	1,3,5-Trimethylbenzene	**3.85**		ug/L	1.74	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
541-73-1	1,3-Dichlorobenzene	ND		ug/L	1.42	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-46-7	1,4-Dichlorobenzene	ND		ug/L	1.56	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-93-3	2-Butanone	**85.9**	CCVE, ICVE, QL-02	ug/L	2.10	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: TS-01-GW-E5 **Sample ID:** 26C0140-05

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 1:30 pm	03/03/2026

VOA, 8260 LOW MASTER

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
591-78-6	2-Hexanone	**5.30**	CCVE, ICVE, QL-02	ug/L	1.60	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-10-1	4-Methyl-2-pentanone	**15.9**	CCVE, ICVE, QL-02	ug/L	1.82	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-64-1	Acetone	**608**	CAL-E	ug/L	33.5	50.0	25	EPA 8260D	03/05/2026 08:00	03/06/2026 01:13	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-02-8	Acrolein	ND	ICVE	ug/L	2.24	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-13-1	Acrylonitrile	ND		ug/L	2.11	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-43-2	Benzene	**26.4**		ug/L	1.40	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-97-5	Bromochloromethane	ND		ug/L	1.77	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
75-27-4	Bromodichloromethane	ND		ug/L	1.22	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-25-2	Bromoform	ND		ug/L	0.815	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-83-9	Bromomethane	ND	CCVE	ug/L	2.50	10.0	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-15-0	Carbon disulfide	ND		ug/L	1.81	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
56-23-5	Carbon tetrachloride	ND		ug/L	1.02	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-90-7	Chlorobenzene	ND		ug/L	1.42	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-00-3	Chloroethane	ND		ug/L	2.24	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-66-3	Chloroform	ND		ug/L	1.22	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-87-3	Chloromethane	ND	CCVE	ug/L	1.86	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-59-2	cis-1,2-Dichloroethylene	ND		ug/L	1.47	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-01-5	cis-1,3-Dichloropropylene	ND		ug/L	1.31	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
110-82-7	Cyclohexane	ND		ug/L	2.46	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
124-48-1	Dibromochloromethane	ND		ug/L	0.730	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-95-3	Dibromomethane	ND		ug/L	1.02	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		

Sample Information

Client Sample ID: TS-01-GW-E5 **Sample ID:** 26C0140-05

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 1:30 pm	03/03/2026

VOA, 8260 LOW MASTER

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-71-8	Dichlorodifluoromethane	ND	CCVE, ICVE	ug/L	2.26	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
100-41-4	Ethyl Benzene	**1.80**		ug/L	1.45	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-68-3	Hexachlorobutadiene	ND		ug/L	1.20	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	NYSDOH-NY12058,PADEP-68-04440		
98-82-8	Isopropylbenzene	ND		ug/L	2.02	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-20-9	Methyl acetate	ND		ug/L	2.21	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
1634-04-4	Methyl tert-butyl ether (MTBE)	**26.6**		ug/L	1.22	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-87-2	Methylcyclohexane	ND		ug/L	2.38	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
75-09-2	Methylene chloride	**6.70**		ug/L	1.98	10.0	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
104-51-8	n-Butylbenzene	ND		ug/L	2.00	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
103-65-1	n-Propylbenzene	ND		ug/L	1.92	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-47-6	o-Xylene	**7.65**		ug/L	1.30	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
179601-23-1	p- & m- Xylenes	**9.25**		ug/L	2.89	5.00	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
99-87-6	p-Isopropyltoluene	ND		ug/L	1.88	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
135-98-8	sec-Butylbenzene	ND		ug/L	2.22	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
100-42-5	Styrene	ND		ug/L	1.28	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-65-0	tert-Butyl alcohol (TBA)	ND		ug/L	3.04	5.00	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
98-06-6	tert-Butylbenzene	ND		ug/L	1.84	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
127-18-4	Tetrachloroethylene	ND		ug/L	1.20	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-88-3	Toluene	**6.10**		ug/L	1.73	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-60-5	trans-1,2-Dichloroethylene	ND		ug/L	1.40	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-02-6	trans-1,3-Dichloropropylene	ND		ug/L	1.14	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: TS-01-GW-E5 **Sample ID:** 26C0140-05

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 1:30 pm	03/03/2026

VOA, 8260 LOW MASTER

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
79-01-6	Trichloroethylene	ND		ug/L	1.24	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-69-4	Trichlorofluoromethane	ND		ug/L	1.68	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-01-4	Vinyl Chloride	ND		ug/L	2.34	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
1330-20-7	Xylenes, Total	**16.9**		ug/L	4.20	7.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 11:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: SURR: 1,2-Dichloroethane-d4*	*101 %*	*69-130*
17060-07-0	*Surrogate: SURR: 1,2-Dichloroethane-d4*	*108 %*	*69-130*
2037-26-5	*Surrogate: SURR: Toluene-d8*	*102 %*	*81-117*
2037-26-5	*Surrogate: SURR: Toluene-d8*	*109 %*	*81-117*
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*108 %*	*79-122*
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*104 %*	*79-122*

SVOA, 8270 LOW MASTER

Log-in Notes:

Sample Notes: EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
92-52-4	1,1-Biphenyl	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	NYSDOH-NY10854,PADEP-68-04440		
122-66-7	1,2-Diphenylhydrazine (as Azobenzene)	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
58-90-2	2,3,4,6-Tetrachlorophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	NYSDOH-NY10854,PADEP-68-04440		
95-95-4	2,4,5-Trichlorophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
88-06-2	2,4,6-Trichlorophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
120-83-2	2,4-Dichlorophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
105-67-9	2,4-Dimethylphenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
51-28-5	* 2,4-Dinitrophenol	ND	CAL-E	ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005		
121-14-2	2,4-Dinitrotoluene	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
606-20-2	2,6-Dinitrotoluene	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		

Sample Information

Client Sample ID: TS-01-GW-E5 **Sample ID:** 26C0140-05

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 1:30 pm	03/03/2026

SVOA, 8270 LOW MASTER **Log-in Notes:** **Sample Notes:** EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
91-58-7	2-Chloronaphthalene	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
95-57-8	2-Chlorophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
91-57-6	2-Methylnaphthalene	**6.81**		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
95-48-7	2-Methylphenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
88-74-4	2-Nitroaniline	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
88-75-5	2-Nitrophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
65794-96-9	* 3- & 4-Methylphenols	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	CTDPH-PH-0840		
91-94-1	3,3-Dichlorobenzidine	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
99-09-2	3-Nitroaniline	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
534-52-1	4,6-Dinitro-2-methylphenol	ND	CAL-E	ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
101-55-3	4-Bromophenyl phenyl ether	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
59-50-7	4-Chloro-3-methylphenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
106-47-8	4-Chloroaniline	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
7005-72-3	4-Chlorophenyl phenyl ether	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
100-01-6	4-Nitroaniline	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
100-02-7	4-Nitrophenol	ND		ug/L	5.00	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
98-86-2	Acetophenone	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
62-53-3	Aniline	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
100-52-7	Benzaldehyde	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
92-87-5	Benzidine	ND	CAL-E, CCVE	ug/L	5.00	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
65-85-0	Benzoic acid	**85.5**		ug/L	12.5	25.0	5	EPA 8270E	03/04/2026 14:00	03/05/2026 11:23	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		

Sample Information

Client Sample ID: TS-01-GW-E5 **Sample ID:** 26C0140-05

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 1:30 pm	03/03/2026

SVOA, 8270 LOW MASTER **Log-in Notes:** **Sample Notes:** EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
100-51-6	Benzyl alcohol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
85-68-7	Benzyl butyl phthalate	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
111-91-1	Bis(2-chloroethoxy)methane	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
111-44-4	Bis(2-chloroethyl)ether	ND		ug/L	1.00	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
108-60-1	Bis(2-chloroisopropyl)ether	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
105-60-2	Caprolactam	ND	ICVE	ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
86-74-8	Carbazole	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
132-64-9	Dibenzofuran	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
84-66-2	Diethyl phthalate	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
131-11-3	Dimethyl phthalate	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
84-74-2	Di-n-butyl phthalate	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
117-84-0	Di-n-octyl phthalate	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
122-39-4	Diphenylamine	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	NYSDOH-NY10854,PADEP-68-04440		
77-47-4	Hexachlorocyclopentadiene	ND	CAL-E	ug/L	5.00	10.0	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
78-59-1	Isophorone	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
621-64-7	N-nitroso-di-n-propylamine	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
86-30-6	N-Nitrosodiphenylamine	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
108-95-2	Phenol	ND		ug/L	0.750	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
110-86-1	Pyridine	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:07	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		

	Surrogate Recoveries	Result		Acceptance Range
367-12-4	*Surrogate: SURR: 2-Fluorophenol*	*18.9 %*	S-08	*19.7-63.1*
13127-88-3	*Surrogate: SURR: Phenol-d6*	*11.1 %*		*10.1-41.7*
4165-60-0	*Surrogate: SURR: Nitrobenzene-d5*	*37.1 %*	S-08	*50.2-113*
321-60-8	*Surrogate: SURR: 2-Fluorobiphenyl*	*36.6 %*	S-08	*39.9-105*

Sample Information

Client Sample ID: TS-01-GW-E5 **Sample ID:** 26C0140-05

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 1:30 pm	03/03/2026

SVOA, 8270 LOW MASTER

Log-in Notes: **Sample Notes:** EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
118-79-6	*Surrogate: SURR: 2,4,6-Tribromophenol*	*37.7 %*	S-08		*39.3-151*						
1718-51-0	*Surrogate: SURR: Terphenyl-d14*	*44.5 %*			*30.7-106*						

SVOA, 8270 SIM MASTER

Log-in Notes: **Sample Notes:** EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	**0.860**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 12:55	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
208-96-8	Acenaphthylene	**0.243**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 12:55	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
120-12-7	* Anthracene	**0.633**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 12:55	SR
								Certifications:			
1912-24-9	* Atrazine	ND		ug/L	0.500	0.500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 12:55	SR
								Certifications:			
56-55-3	Benzo(a)anthracene	**1.49**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 12:55	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
50-32-8	Benzo(a)pyrene	**0.652**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 12:55	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
205-99-2	Benzo(b)fluoranthene	**0.900**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 12:55	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
191-24-2	Benzo(g,h,i)perylene	**0.624**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 12:55	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
207-08-9	Benzo(k)fluoranthene	**0.923**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 12:55	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
117-81-7	* Bis(2-ethylhexyl)phthalate	**1.95**	CCVE	ug/L	0.500	0.500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 12:55	SR
								Certifications:			
218-01-9	Chrysene	**1.43**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 12:55	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
53-70-3	Dibenzo(a,h)anthracene	**0.135**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 12:55	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
206-44-0	Fluoranthene	**3.05**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 12:55	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
86-73-7	Fluorene	**1.22**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 12:55	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
118-74-1	* Hexachlorobenzene	ND		ug/L	0.0200	0.0200	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 12:55	SR
								Certifications:			
87-68-3	* Hexachlorobutadiene	ND		ug/L	0.500	0.500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 12:55	SR
								Certifications:			
67-72-1	* Hexachloroethane	ND		ug/L	0.500	0.500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 12:55	SR
								Certifications:			

Sample Information

Client Sample ID: TS-01-GW-E5 **Sample ID:** 26C0140-05

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 1:30 pm	03/03/2026

SVOA, 8270 SIM MASTER

Log-in Notes:

Sample Notes: EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
193-39-5	Indeno(1,2,3-cd)pyrene	**0.528**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 12:55	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
91-20-3	Naphthalene	**41.7**		ug/L	0.500	0.500	10	EPA 8270E SIM	03/04/2026 14:05	03/09/2026 18:30	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
98-95-3	* Nitrobenzene	ND	ICVE, CCVE	ug/L	0.250	0.250	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 12:55	SR
								Certifications:			
62-75-9	* N-Nitrosodimethylamine	ND		ug/L	0.500	0.500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 12:55	SR
								Certifications:			
87-86-5	* Pentachlorophenol	ND	CCVE	ug/L	0.250	0.250	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 12:55	SR
								Certifications:			
85-01-8	Phenanthrene	**5.85**		ug/L	0.500	0.500	10	EPA 8270E SIM	03/04/2026 14:05	03/09/2026 18:30	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
129-00-0	Pyrene	**1.97**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 12:55	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			

Total Organic Carbon

Log-in Notes:

Sample Notes:

Sample Prepared by Method: Analysis Preparation

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
TOC	Total Organic Carbon (TOC)	**8980**		mg/L	50.0	50.0	50	SM 5310B-2014	03/05/2026 14:19	03/09/2026 09:37	JAMT
								Certifications: NYSDOH-NY10854,CTDPH-PH-0840,NJDEP-CT005,PADEP-68-0			

Sample Information

Client Sample ID: TS-01-GW-E6 **Sample ID:** 26C0140-06

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 1:45 pm	03/03/2026

VOA, 8260 LOW MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND		ug/L	1.08	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-55-6	1,1,1-Trichloroethane	ND		ug/L	1.33	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-34-5	1,1,2,2-Tetrachloroethane	ND		ug/L	1.28	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		ug/L	1.43	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-00-5	1,1,2-Trichloroethane	ND		ug/L	1.24	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-34-3	1,1-Dichloroethane	ND		ug/L	1.36	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-35-4	1,1-Dichloroethylene	ND		ug/L	1.64	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-61-6	1,2,3-Trichlorobenzene	ND		ug/L	1.11	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
96-18-4	1,2,3-Trichloropropane	ND		ug/L	1.36	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
120-82-1	1,2,4-Trichlorobenzene	ND		ug/L	0.690	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
95-63-6	1,2,4-Trimethylbenzene	**11.8**		ug/L	1.55	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
96-12-8	1,2-Dibromo-3-chloropropane	ND		ug/L	2.16	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-93-4	1,2-Dibromoethane	ND		ug/L	1.08	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-50-1	1,2-Dichlorobenzene	ND		ug/L	1.35	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-06-2	1,2-Dichloroethane	ND		ug/L	1.88	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-87-5	1,2-Dichloropropane	ND		ug/L	1.64	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-67-8	1,3,5-Trimethylbenzene	**3.10**		ug/L	1.74	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
541-73-1	1,3-Dichlorobenzene	ND		ug/L	1.42	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-46-7	1,4-Dichlorobenzene	ND		ug/L	1.56	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-93-3	2-Butanone	**85.0**	CCVE, ICVE, QL-02	ug/L	2.10	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: TS-01-GW-E6 **Sample ID:** 26C0140-06

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 1:45 pm	03/03/2026

VOA, 8260 LOW MASTER

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
591-78-6	2-Hexanone	ND		ug/L	1.60	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-10-1	4-Methyl-2-pentanone	ND		ug/L	1.82	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-64-1	Acetone	**588**	CAL-E	ug/L	33.5	50.0	25	EPA 8260D	03/05/2026 08:00	03/06/2026 01:43	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-02-8	Acrolein	**3.85**	CCVE, ICVE	ug/L	2.24	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-13-1	Acrylonitrile	ND		ug/L	2.11	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-43-2	Benzene	**23.8**		ug/L	1.40	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-97-5	Bromochloromethane	ND		ug/L	1.77	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
75-27-4	Bromodichloromethane	ND		ug/L	1.22	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-25-2	Bromoform	ND		ug/L	0.815	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-83-9	Bromomethane	ND	CCVE	ug/L	2.50	10.0	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-15-0	Carbon disulfide	ND		ug/L	1.81	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
56-23-5	Carbon tetrachloride	ND		ug/L	1.02	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-90-7	Chlorobenzene	ND		ug/L	1.42	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-00-3	Chloroethane	ND		ug/L	2.24	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-66-3	Chloroform	ND		ug/L	1.22	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-87-3	Chloromethane	ND	CCVE	ug/L	1.86	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-59-2	cis-1,2-Dichloroethylene	ND		ug/L	1.47	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-01-5	cis-1,3-Dichloropropylene	ND		ug/L	1.31	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
110-82-7	Cyclohexane	ND		ug/L	2.46	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
124-48-1	Dibromochloromethane	ND		ug/L	0.730	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-95-3	Dibromomethane	ND		ug/L	1.02	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		

Sample Information

Client Sample ID: TS-01-GW-E6 **Sample ID:** 26C0140-06

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 1:45 pm	03/03/2026

VOA, 8260 LOW MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-71-8	Dichlorodifluoromethane	ND	CCVE, ICVE	ug/L	2.26	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
100-41-4	Ethyl Benzene	ND		ug/L	1.45	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-68-3	Hexachlorobutadiene	ND		ug/L	1.20	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	NYSDOH-NY12058,PADEP-68-04440		
98-82-8	Isopropylbenzene	ND		ug/L	2.02	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-20-9	Methyl acetate	ND		ug/L	2.21	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
1634-04-4	Methyl tert-butyl ether (MTBE)	**18.0**		ug/L	1.22	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-87-2	Methylcyclohexane	ND		ug/L	2.38	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
75-09-2	Methylene chloride	**18.6**		ug/L	1.98	10.0	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
104-51-8	n-Butylbenzene	ND		ug/L	2.00	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
103-65-1	n-Propylbenzene	ND		ug/L	1.92	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-47-6	o-Xylene	**5.30**		ug/L	1.30	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
179601-23-1	p- & m- Xylenes	**6.45**		ug/L	2.89	5.00	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
99-87-6	p-Isopropyltoluene	ND		ug/L	1.88	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
135-98-8	sec-Butylbenzene	ND		ug/L	2.22	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
100-42-5	Styrene	ND		ug/L	1.28	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-65-0	tert-Butyl alcohol (TBA)	ND		ug/L	3.04	5.00	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
98-06-6	tert-Butylbenzene	ND		ug/L	1.84	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
127-18-4	Tetrachloroethylene	ND		ug/L	1.20	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-88-3	Toluene	**4.65**		ug/L	1.73	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-60-5	trans-1,2-Dichloroethylene	ND		ug/L	1.40	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-02-6	trans-1,3-Dichloropropylene	ND		ug/L	1.14	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: TS-01-GW-E6 **Sample ID:** 26C0140-06

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 1:45 pm	03/03/2026

VOA, 8260 LOW MASTER

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
79-01-6	Trichloroethylene	ND		ug/L	1.24	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-69-4	Trichlorofluoromethane	ND		ug/L	1.68	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-01-4	Vinyl Chloride	ND		ug/L	2.34	2.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
1330-20-7	Xylenes, Total	**11.8**		ug/L	4.20	7.50	5	EPA 8260D	03/04/2026 08:00	03/04/2026 12:24	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: SURR: 1,2-Dichloroethane-d4*	*114 %*	*69-130*
17060-07-0	*Surrogate: SURR: 1,2-Dichloroethane-d4*	*104 %*	*69-130*
2037-26-5	*Surrogate: SURR: Toluene-d8*	*109 %*	*81-117*
2037-26-5	*Surrogate: SURR: Toluene-d8*	*102 %*	*81-117*
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*103 %*	*79-122*
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*110 %*	*79-122*

SVOA, 8270 LOW MASTER

Log-in Notes:

Sample Notes: EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
92-52-4	1,1-Biphenyl	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	NYSDOH-NY10854,PADEP-68-04440		
122-66-7	1,2-Diphenylhydrazine (as Azobenzene)	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
58-90-2	2,3,4,6-Tetrachlorophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	NYSDOH-NY10854,PADEP-68-04440		
95-95-4	2,4,5-Trichlorophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
88-06-2	2,4,6-Trichlorophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
120-83-2	2,4-Dichlorophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
105-67-9	2,4-Dimethylphenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
51-28-5	* 2,4-Dinitrophenol	ND	CAL-E	ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005		
121-14-2	2,4-Dinitrotoluene	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
606-20-2	2,6-Dinitrotoluene	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		

Sample Information

Client Sample ID: TS-01-GW-E6 **Sample ID:** 26C0140-06

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 1:45 pm	03/03/2026

SVOA, 8270 LOW MASTER **Log-in Notes:** **Sample Notes:** EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
91-58-7	2-Chloronaphthalene	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
95-57-8	2-Chlorophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
91-57-6	2-Methylnaphthalene	**4.37**	J	ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
95-48-7	2-Methylphenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
88-74-4	2-Nitroaniline	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
88-75-5	2-Nitrophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
65794-96-9	* 3- & 4-Methylphenols	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	CTDPH-PH-0840		
91-94-1	3,3-Dichlorobenzidine	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
99-09-2	3-Nitroaniline	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
534-52-1	4,6-Dinitro-2-methylphenol	ND	CAL-E	ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
101-55-3	4-Bromophenyl phenyl ether	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
59-50-7	4-Chloro-3-methylphenol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
106-47-8	4-Chloroaniline	**6.92**		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
7005-72-3	4-Chlorophenyl phenyl ether	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
100-01-6	4-Nitroaniline	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
100-02-7	4-Nitrophenol	ND		ug/L	5.00	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
98-86-2	Acetophenone	**3.47**	J	ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
62-53-3	Aniline	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
100-52-7	Benzaldehyde	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
92-87-5	Benzidine	ND	CAL-E, CCVE	ug/L	5.00	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
65-85-0	Benzoic acid	**64.9**		ug/L	12.5	25.0	5	EPA 8270E	03/04/2026 14:00	03/05/2026 11:57	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		

Sample Information

Client Sample ID: TS-01-GW-E6 **Sample ID:** 26C0140-06

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 1:45 pm	03/03/2026

SVOA, 8270 LOW MASTER **Log-in Notes:** **Sample Notes:** EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
100-51-6	Benzyl alcohol	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
85-68-7	Benzyl butyl phthalate	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
111-91-1	Bis(2-chloroethoxy)methane	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
111-44-4	Bis(2-chloroethyl)ether	ND		ug/L	1.00	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
108-60-1	Bis(2-chloroisopropyl)ether	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
105-60-2	Caprolactam	ND	ICVE	ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
86-74-8	Carbazole	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
132-64-9	Dibenzofuran	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
84-66-2	Diethyl phthalate	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
131-11-3	Dimethyl phthalate	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
84-74-2	Di-n-butyl phthalate	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
117-84-0	Di-n-octyl phthalate	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
122-39-4	Diphenylamine	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	NYSDOH-NY10854,PADEP-68-04440		
77-47-4	Hexachlorocyclopentadiene	ND	CAL-E	ug/L	5.00	10.0	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
78-59-1	Isophorone	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
621-64-7	N-nitroso-di-n-propylamine	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
86-30-6	N-Nitrosodiphenylamine	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
108-95-2	Phenol	ND		ug/L	0.750	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
110-86-1	Pyridine	ND		ug/L	2.50	5.00	1	EPA 8270E	03/04/2026 14:00	03/05/2026 03:43	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		

	Surrogate Recoveries	Result		Acceptance Range
367-12-4	*Surrogate: SURR: 2-Fluorophenol*	*19.1 %*	S-08	*19.7-63.1*
13127-88-3	*Surrogate: SURR: Phenol-d6*	*10.9 %*		*10.1-41.7*
4165-60-0	*Surrogate: SURR: Nitrobenzene-d5*	*36.8 %*	S-08	*50.2-113*
321-60-8	*Surrogate: SURR: 2-Fluorobiphenyl*	*39.5 %*	S-08	*39.9-105*

Sample Information

Client Sample ID: TS-01-GW-E6 **Sample ID:** 26C0140-06

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 1:45 pm	03/03/2026

SVOA, 8270 LOW MASTER

Log-in Notes: **Sample Notes:** EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
118-79-6	*Surrogate: SURR: 2,4,6-Tribromophenol*	*42.1 %*			*39.3-151*						
1718-51-0	*Surrogate: SURR: Terphenyl-d14*	*46.7 %*			*30.7-106*						

SVOA, 8270 SIM MASTER

Log-in Notes: **Sample Notes:** EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	**0.562**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 13:26	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
208-96-8	Acenaphthylene	**0.140**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 13:26	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
120-12-7	* Anthracene	**0.546**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 13:26	SR
								Certifications:			
1912-24-9	* Atrazine	ND		ug/L	0.500	0.500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 13:26	SR
								Certifications:			
56-55-3	Benzo(a)anthracene	**0.976**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 13:26	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
50-32-8	Benzo(a)pyrene	**0.393**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 13:26	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
205-99-2	Benzo(b)fluoranthene	**0.612**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 13:26	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
191-24-2	Benzo(g,h,i)perylene	**0.386**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 13:26	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
207-08-9	Benzo(k)fluoranthene	**0.615**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 13:26	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
117-81-7	* Bis(2-ethylhexyl)phthalate	**1.24**	CCVE	ug/L	0.500	0.500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 13:26	SR
								Certifications:			
218-01-9	Chrysene	**0.994**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 13:26	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
53-70-3	Dibenzo(a,h)anthracene	**0.144**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 13:26	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
206-44-0	Fluoranthene	**2.40**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 13:26	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
86-73-7	Fluorene	**0.883**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 13:26	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
118-74-1	* Hexachlorobenzene	ND		ug/L	0.0200	0.0200	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 13:26	SR
								Certifications:			
87-68-3	* Hexachlorobutadiene	ND		ug/L	0.500	0.500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 13:26	SR
								Certifications:			
67-72-1	* Hexachloroethane	ND		ug/L	0.500	0.500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 13:26	SR
								Certifications:			

Sample Information

Client Sample ID: TS-01-GW-E6 **Sample ID:** 26C0140-06

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Ground Water	March 3, 2026 1:45 pm	03/03/2026

SVOA, 8270 SIM MASTER

Log-in Notes:

Sample Notes: EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
193-39-5	Indeno(1,2,3-cd)pyrene	**0.337**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 13:26	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
91-20-3	Naphthalene	**24.7**		ug/L	0.500	0.500	10	EPA 8270E SIM	03/04/2026 14:05	03/09/2026 19:01	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
98-95-3	* Nitrobenzene	ND	CCVE, ICVE	ug/L	0.250	0.250	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 13:26	SR
								Certifications:			
62-75-9	* N-Nitrosodimethylamine	ND		ug/L	0.500	0.500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 13:26	SR
								Certifications:			
87-86-5	* Pentachlorophenol	ND	CCVE	ug/L	0.250	0.250	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 13:26	SR
								Certifications:			
85-01-8	Phenanthrene	**4.15**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 13:26	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
129-00-0	Pyrene	**1.30**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	03/04/2026 14:05	03/05/2026 13:26	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			

Total Organic Carbon

Log-in Notes:

Sample Notes:

Sample Prepared by Method: Analysis Preparation

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
TOC	Total Organic Carbon (TOC)	**7990**		mg/L	50.0	50.0	50	SM 5310B-2014	03/05/2026 14:19	03/09/2026 09:37	JAMT
								Certifications: NYSDOH-NY10854,CTDPH-PH-0840,NJDEP-CT005,PADEP-68-0			

Sample Information

Client Sample ID: TS-01-S-E1 **Sample ID:** 26C0140-07

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 2:00 pm	03/03/2026

VOA, 8260 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-55-6	1,1,1-Trichloroethane	ND		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-34-5	1,1,2,2-Tetrachloroethane	ND	QL-02	mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	CCVE	mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-00-5	1,1,2-Trichloroethane	ND		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-34-3	1,1-Dichloroethane	ND		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-35-4	1,1-Dichloroethylene	ND		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-61-6	1,2,3-Trichlorobenzene	ND		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
96-18-4	1,2,3-Trichloropropane	ND		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
120-82-1	1,2,4-Trichlorobenzene	ND		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
95-63-6	1,2,4-Trimethylbenzene	**43**	QL-02	mg/kg dry	0.38	0.76	100	EPA 8260D	03/09/2026 10:05	03/11/2026 09:11	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
96-12-8	1,2-Dibromo-3-chloropropane	ND		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-93-4	1,2-Dibromoethane	ND		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-50-1	1,2-Dichlorobenzene	ND		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-06-2	1,2-Dichloroethane	ND		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-87-5	1,2-Dichloropropane	ND	QL-02	mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-67-8	1,3,5-Trimethylbenzene	**0.33**		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
541-73-1	1,3-Dichlorobenzene	ND		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-46-7	1,4-Dichlorobenzene	ND		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-93-3	2-Butanone	ND		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
591-78-6	2-Hexanone	ND	CCVE	mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: TS-01-S-E1 **Sample ID:** 26C0140-07

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 2:00 pm	03/03/2026

VOA, 8260 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
108-10-1	4-Methyl-2-pentanone	ND	QL-02, CCVE	mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-64-1	Acetone	**0.12**		mg/kg dry	0.0064	0.013	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-02-8	Acrolein	ND	ICVE	mg/kg dry	0.0064	0.013	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-13-1	Acrylonitrile	ND		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-43-2	Benzene	**0.40**		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-97-5	Bromochloromethane	ND		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
75-27-4	Bromodichloromethane	ND		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-25-2	Bromoform	ND		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-83-9	Bromomethane	ND		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-15-0	Carbon disulfide	**0.0038**	J	mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
56-23-5	Carbon tetrachloride	ND		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-90-7	Chlorobenzene	ND		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-00-3	Chloroethane	ND		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-66-3	Chloroform	ND		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-87-3	Chloromethane	ND	CCVE	mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-59-2	cis-1,2-Dichloroethylene	ND		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-01-5	cis-1,3-Dichloropropylene	ND		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
110-82-7	Cyclohexane	ND		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
124-48-1	Dibromochloromethane	ND		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
74-95-3	Dibromomethane	ND		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
75-71-8	Dichlorodifluoromethane	ND		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		

Sample Information

Client Sample ID: TS-01-S-E1 **Sample ID:** 26C0140-07

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 2:00 pm	03/03/2026

VOA, 8260 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
100-41-4	Ethyl Benzene	**0.12**		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-68-3	Hexachlorobutadiene	ND		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
98-82-8	Isopropylbenzene	**0.037**		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-20-9	Methyl acetate	ND		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
1634-04-4	Methyl tert-butyl ether (MTBE)	**0.098**		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-87-2	Methylcyclohexane	**0.027**		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
75-09-2	Methylene chloride	**0.016**		mg/kg dry	0.0064	0.013	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NJDEP-CT005,PADEP-68-0		
104-51-8	n-Butylbenzene	ND	QL-02, CCVE	mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
103-65-1	n-Propylbenzene	**0.099**		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-47-6	o-Xylene	**0.29**		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
179601-23-1	p- & m- Xylenes	**0.48**		mg/kg dry	0.0064	0.013	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
99-87-6	p-Isopropyltoluene	**0.010**	QL-02	mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
135-98-8	sec-Butylbenzene	**0.018**		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
100-42-5	Styrene	ND		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-65-0	tert-Butyl alcohol (TBA)	ND		mg/kg dry	0.016	0.032	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
98-06-6	tert-Butylbenzene	ND		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
127-18-4	Tetrachloroethylene	ND		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-88-3	Toluene	**0.23**		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-60-5	trans-1,2-Dichloroethylene	ND		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-02-6	trans-1,3-Dichloropropylene	ND		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-01-6	Trichloroethylene	ND		mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: TS-01-S-E1 **Sample ID:** 26C0140-07

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 2:00 pm	03/03/2026

VOA, 8260 MASTER

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-69-4	Trichlorofluoromethane	ND	CCVE	mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-01-4	Vinyl Chloride	ND	CCVE	mg/kg dry	0.0032	0.0064	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
1330-20-7	Xylenes, Total	**0.78**		mg/kg dry	0.0097	0.019	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:06	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: SURR: 1,2-Dichloroethane-d4*	*112 %*	*77-125*
17060-07-0	*Surrogate: SURR: 1,2-Dichloroethane-d4*	*119 %*	*77-125*
2037-26-5	*Surrogate: SURR: Toluene-d8*	*92.3 %*	*85-120*
2037-26-5	*Surrogate: SURR: Toluene-d8*	*95.0 %*	*85-120*
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*102 %*	*76-130*
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*88.3 %*	*76-130*

SVOA, 8270 MASTER

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
92-52-4	1,1-Biphenyl	**0.0926**	J	mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		mg/kg dry	0.116	0.231	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
122-66-7	1,2-Diphenylhydrazine (as Azobenzene)	ND		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
58-90-2	2,3,4,6-Tetrachlorophenol	ND		mg/kg dry	0.116	0.231	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
95-95-4	2,4,5-Trichlorophenol	ND		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
88-06-2	2,4,6-Trichlorophenol	ND		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
120-83-2	2,4-Dichlorophenol	ND		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
105-67-9	2,4-Dimethylphenol	ND		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
51-28-5	2,4-Dinitrophenol	ND	CAL-E	mg/kg dry	0.116	0.231	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
121-14-2	2,4-Dinitrotoluene	ND		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
606-20-2	2,6-Dinitrotoluene	ND		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
91-58-7	2-Chloronaphthalene	ND		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		

Sample Information

Client Sample ID: TS-01-S-E1 **Sample ID:** 26C0140-07

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 2:00 pm	03/03/2026

SVOA, 8270 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
95-57-8	2-Chlorophenol	ND		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
91-57-6	2-Methylnaphthalene	**1.30**		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
95-48-7	2-Methylphenol	ND		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
88-74-4	2-Nitroaniline	ND		mg/kg dry	0.116	0.231	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
88-75-5	2-Nitrophenol	ND		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
65794-96-9	* 3- & 4-Methylphenols	ND		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840		
91-94-1	3,3-Dichlorobenzidine	ND		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
99-09-2	3-Nitroaniline	ND		mg/kg dry	0.116	0.231	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
534-52-1	4,6-Dinitro-2-methylphenol	ND	CAL-E	mg/kg dry	0.116	0.231	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
101-55-3	4-Bromophenyl phenyl ether	ND		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
59-50-7	4-Chloro-3-methylphenol	ND		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
106-47-8	4-Chloroaniline	ND		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
7005-72-3	4-Chlorophenyl phenyl ether	ND		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
100-01-6	4-Nitroaniline	ND		mg/kg dry	0.116	0.231	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
100-02-7	4-Nitrophenol	ND	CAL-E	mg/kg dry	0.116	0.231	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
83-32-9	Acenaphthene	**0.354**		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
208-96-8	Acenaphthylene	**0.111**	J	mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
98-86-2	Acetophenone	ND		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
62-53-3	Aniline	ND		mg/kg dry	0.101	0.464	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
120-12-7	Anthracene	**0.645**		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
1912-24-9	Atrazine	ND		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		

Sample Information

Client Sample ID: TS-01-S-E1 **Sample ID:** 26C0140-07

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 2:00 pm	03/03/2026

SVOA, 8270 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
100-52-7	Benzaldehyde	ND	CAL-E	mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
92-87-5	Benzidine	ND		mg/kg dry	0.232	0.464	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
56-55-3	Benzo(a)anthracene	**1.01**		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
50-32-8	Benzo(a)pyrene	**0.680**		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
205-99-2	Benzo(b)fluoranthene	**0.663**		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
191-24-2	Benzo(g,h,i)perylene	**0.340**	CCVE	mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
207-08-9	Benzo(k)fluoranthene	**0.584**		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
65-85-0	Benzoic acid	ND	CAL-E, CCVE	mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
100-51-6	Benzyl alcohol	ND		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
85-68-7	Benzyl butyl phthalate	**0.261**		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
111-91-1	Bis(2-chloroethoxy)methane	ND		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
111-44-4	Bis(2-chloroethyl)ether	ND		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
108-60-1	Bis(2-chloroisopropyl)ether	ND	CAL-E, CCVE	mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
117-81-7	Bis(2-ethylhexyl)phthalate	**1.23**		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
105-60-2	Caprolactam	ND	CAL-E	mg/kg dry	0.116	0.231	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
86-74-8	Carbazole	**0.262**		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
218-01-9	Chrysene	**0.900**		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
53-70-3	Dibenzo(a,h)anthracene	**0.119**		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
132-64-9	Dibenzofuran	**0.235**		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
84-66-2	Diethyl phthalate	ND		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
131-11-3	Dimethyl phthalate	ND		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		

Sample Information

Client Sample ID: TS-01-S-E1 **Sample ID:** 26C0140-07

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 2:00 pm	03/03/2026

SVOA, 8270 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
84-74-2	Di-n-butyl phthalate	ND		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
117-84-0	Di-n-octyl phthalate	**0.293**		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
122-39-4	Diphenylamine	ND		mg/kg dry	0.116	0.231	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	PADEP-68-04440,NYSDOH-NY10854		
206-44-0	Fluoranthene	**2.28**		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
86-73-7	Fluorene	**0.450**		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
118-74-1	Hexachlorobenzene	ND		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
87-68-3	Hexachlorobutadiene	ND		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
77-47-4	Hexachlorocyclopentadiene	ND	CAL-E, CCVE	mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
67-72-1	Hexachloroethane	ND		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
193-39-5	Indeno(1,2,3-cd)pyrene	**0.272**		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
78-59-1	Isophorone	ND		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
91-20-3	Naphthalene	**2.45**		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
98-95-3	Nitrobenzene	ND		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
62-75-9	N-Nitrosodimethylamine	ND	CCVE	mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
621-64-7	N-nitroso-di-n-propylamine	ND		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
86-30-6	N-Nitrosodiphenylamine	ND		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
87-86-5	Pentachlorophenol	ND	CAL-E, CCVE	mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
85-01-8	Phenanthrene	**2.56**		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
108-95-2	Phenol	ND		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
129-00-0	Pyrene	**2.66**		mg/kg dry	0.0581	0.116	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
110-86-1	Pyridine	ND		mg/kg dry	0.232	0.464	1	EPA 8270E	03/04/2026 09:04	03/05/2026 01:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		

Sample Information

Client Sample ID: TS-01-S-E1 **Sample ID:** 26C0140-07

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 2:00 pm	03/03/2026

SVOA, 8270 MASTER

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
	Surrogate Recoveries	**Result**			**Acceptance Range**						
367-12-4	*Surrogate: SURR: 2-Fluorophenol*	*28.0 %*			*20-108*						
13127-88-3	*Surrogate: SURR: Phenol-d6*	*28.9 %*			*23-114*						
4165-60-0	*Surrogate: SURR: Nitrobenzene-d5*	*37.5 %*			*22-108*						
321-60-8	*Surrogate: SURR: 2-Fluorobiphenyl*	*34.4 %*			*21-113*						
118-79-6	*Surrogate: SURR: 2,4,6-Tribromophenol*	*38.5 %*			*19-110*						
1718-51-0	*Surrogate: SURR: Terphenyl-d14*	*57.5 %*			*24-116*						

Total Solids

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	* % Solids	**70.2**		%	0.100	0.100	1	SM 2540G	03/04/2026 09:07	03/04/2026 15:05	CD
								Certifications: CTDPH-PH-0840			

Sample Information

Client Sample ID: TS-01-S-E2 **Sample ID:** 26C0140-08

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 2:15 pm	03/03/2026

VOA, 8260 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-55-6	1,1,1-Trichloroethane	ND		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-34-5	1,1,2,2-Tetrachloroethane	ND	QL-02	mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	CCVE	mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-00-5	1,1,2-Trichloroethane	ND		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-34-3	1,1-Dichloroethane	ND		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-35-4	1,1-Dichloroethylene	ND		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-61-6	1,2,3-Trichlorobenzene	ND		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
96-18-4	1,2,3-Trichloropropane	ND		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
120-82-1	1,2,4-Trichlorobenzene	ND		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
95-63-6	1,2,4-Trimethylbenzene	**29**	QL-02	mg/kg dry	0.37	0.75	100	EPA 8260D	03/09/2026 10:05	03/11/2026 09:39	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
96-12-8	1,2-Dibromo-3-chloropropane	ND		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-93-4	1,2-Dibromoethane	ND		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-50-1	1,2-Dichlorobenzene	ND		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-06-2	1,2-Dichloroethane	ND		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-87-5	1,2-Dichloropropane	ND	QL-02	mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-67-8	1,3,5-Trimethylbenzene	**0.16**		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
541-73-1	1,3-Dichlorobenzene	ND		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-46-7	1,4-Dichlorobenzene	ND		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-93-3	2-Butanone	ND		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
591-78-6	2-Hexanone	ND	CCVE	mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: TS-01-S-E2 **Sample ID:** 26C0140-08

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 2:15 pm	03/03/2026

VOA, 8260 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
108-10-1	4-Methyl-2-pentanone	ND	CCVE, QL-02	mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-64-1	Acetone	**0.10**		mg/kg dry	0.0062	0.012	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-02-8	Acrolein	ND	ICVE	mg/kg dry	0.0062	0.012	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-13-1	Acrylonitrile	ND		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-43-2	Benzene	**0.41**		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-97-5	Bromochloromethane	ND		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
75-27-4	Bromodichloromethane	ND		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-25-2	Bromoform	ND		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-83-9	Bromomethane	ND		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-15-0	Carbon disulfide	**0.0032**	J	mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
56-23-5	Carbon tetrachloride	ND		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-90-7	Chlorobenzene	ND		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-00-3	Chloroethane	ND		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-66-3	Chloroform	ND		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-87-3	Chloromethane	ND	CCVE	mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-59-2	cis-1,2-Dichloroethylene	**0.0036**	J	mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-01-5	cis-1,3-Dichloropropylene	ND		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
110-82-7	Cyclohexane	ND		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
124-48-1	Dibromochloromethane	ND		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
74-95-3	Dibromomethane	ND		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
75-71-8	Dichlorodifluoromethane	ND		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		

Sample Information

Client Sample ID: TS-01-S-E2 **Sample ID:** 26C0140-08

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 2:15 pm	03/03/2026

VOA, 8260 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
100-41-4	Ethyl Benzene	**0.092**		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-68-3	Hexachlorobutadiene	ND		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
98-82-8	Isopropylbenzene	**0.022**		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-20-9	Methyl acetate	ND		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
1634-04-4	Methyl tert-butyl ether (MTBE)	**0.12**		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-87-2	Methylcyclohexane	**0.031**		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
75-09-2	Methylene chloride	**0.014**		mg/kg dry	0.0062	0.012	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NJDEP-CT005,PADEP-68-0		
104-51-8	n-Butylbenzene	ND	CCVE, QL-02	mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
103-65-1	n-Propylbenzene	**0.052**		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-47-6	o-Xylene	**0.22**		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
179601-23-1	p- & m- Xylenes	**0.36**		mg/kg dry	0.0062	0.012	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
99-87-6	p-Isopropyltoluene	ND	QL-02	mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
135-98-8	sec-Butylbenzene	**0.0074**		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
100-42-5	Styrene	ND		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-65-0	tert-Butyl alcohol (TBA)	ND		mg/kg dry	0.015	0.031	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
98-06-6	tert-Butylbenzene	ND		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
127-18-4	Tetrachloroethylene	ND		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-88-3	Toluene	**0.22**		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-60-5	trans-1,2-Dichloroethylene	ND		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-02-6	trans-1,3-Dichloropropylene	ND		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-01-6	Trichloroethylene	ND		mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: TS-01-S-E2 **Sample ID:** 26C0140-08

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 2:15 pm	03/03/2026

VOA, 8260 MASTER

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-69-4	Trichlorofluoromethane	ND	CCVE	mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-01-4	Vinyl Chloride	ND	CCVE	mg/kg dry	0.0031	0.0062	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
1330-20-7	Xylenes, Total	**0.58**		mg/kg dry	0.0092	0.018	1	EPA 8260D	03/09/2026 10:05	03/10/2026 12:34	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: SURR: 1,2-Dichloroethane-d4*	*115 %*	*77-125*
17060-07-0	*Surrogate: SURR: 1,2-Dichloroethane-d4*	*109 %*	*77-125*
2037-26-5	*Surrogate: SURR: Toluene-d8*	*94.8 %*	*85-120*
2037-26-5	*Surrogate: SURR: Toluene-d8*	*93.0 %*	*85-120*
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*92.3 %*	*76-130*
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*90.4 %*	*76-130*

SVOA, 8270 MASTER

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
92-52-4	1,1-Biphenyl	**0.0778**	J	mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		mg/kg dry	0.112	0.223	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
122-66-7	1,2-Diphenylhydrazine (as Azobenzene)	ND		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
58-90-2	2,3,4,6-Tetrachlorophenol	ND		mg/kg dry	0.112	0.223	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
95-95-4	2,4,5-Trichlorophenol	ND		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
88-06-2	2,4,6-Trichlorophenol	ND		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
120-83-2	2,4-Dichlorophenol	ND		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
105-67-9	2,4-Dimethylphenol	ND		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
51-28-5	2,4-Dinitrophenol	ND	CAL-E	mg/kg dry	0.112	0.223	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
121-14-2	2,4-Dinitrotoluene	ND		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
606-20-2	2,6-Dinitrotoluene	ND		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
91-58-7	2-Chloronaphthalene	ND		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		

Sample Information

Client Sample ID: TS-01-S-E2 **Sample ID:** 26C0140-08

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 2:15 pm	03/03/2026

SVOA, 8270 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
95-57-8	2-Chlorophenol	ND		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
91-57-6	2-Methylnaphthalene	**0.971**		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
95-48-7	2-Methylphenol	**0.0599**	J	mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
88-74-4	2-Nitroaniline	ND		mg/kg dry	0.112	0.223	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
88-75-5	2-Nitrophenol	ND		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
65794-96-9	* 3- & 4-Methylphenols	ND		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840		
91-94-1	3,3-Dichlorobenzidine	ND		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
99-09-2	3-Nitroaniline	ND		mg/kg dry	0.112	0.223	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
534-52-1	4,6-Dinitro-2-methylphenol	ND	CAL-E	mg/kg dry	0.112	0.223	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
101-55-3	4-Bromophenyl phenyl ether	ND		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
59-50-7	4-Chloro-3-methylphenol	**0.0706**	J	mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
106-47-8	4-Chloroaniline	ND		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
7005-72-3	4-Chlorophenyl phenyl ether	ND		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
100-01-6	4-Nitroaniline	ND		mg/kg dry	0.112	0.223	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
100-02-7	4-Nitrophenol	**0.201**	J, CAL-E	mg/kg dry	0.112	0.223	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
83-32-9	Acenaphthene	**0.274**		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
208-96-8	Acenaphthylene	**0.118**		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
98-86-2	Acetophenone	**0.118**		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
62-53-3	Aniline	ND		mg/kg dry	0.0972	0.448	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
120-12-7	Anthracene	**2.26**		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
1912-24-9	Atrazine	**0.0787**	J	mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		

Sample Information

Client Sample ID: TS-01-S-E2 **Sample ID:** 26C0140-08

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 2:15 pm	03/03/2026

SVOA, 8270 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
100-52-7	Benzaldehyde	**2.18**	CAL-E	mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
92-87-5	Benzidine	ND		mg/kg dry	0.224	0.448	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
56-55-3	Benzo(a)anthracene	**0.875**		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
50-32-8	Benzo(a)pyrene	**0.682**		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
205-99-2	Benzo(b)fluoranthene	**0.607**		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
191-24-2	Benzo(g,h,i)perylene	**0.317**	CCVE	mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
207-08-9	Benzo(k)fluoranthene	**0.561**		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
65-85-0	Benzoic acid	**0.265**	CAL-E, CCVE	mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
100-51-6	Benzyl alcohol	**0.0626**	J	mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
85-68-7	Benzyl butyl phthalate	**0.455**		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
111-91-1	Bis(2-chloroethoxy)methane	ND		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
111-44-4	Bis(2-chloroethyl)ether	ND		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
108-60-1	Bis(2-chloroisopropyl)ether	ND	CAL-E, CCVE	mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
117-81-7	Bis(2-ethylhexyl)phthalate	**0.983**		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
105-60-2	Caprolactam	ND	CAL-E	mg/kg dry	0.112	0.223	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
86-74-8	Carbazole	**0.198**		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
218-01-9	Chrysene	**0.893**		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
53-70-3	Dibenzo(a,h)anthracene	ND		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
132-64-9	Dibenzofuran	**0.173**		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
84-66-2	Diethyl phthalate	ND		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
131-11-3	Dimethyl phthalate	**0.0671**	J	mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		

Sample Information

Client Sample ID: TS-01-S-E2 **Sample ID:** 26C0140-08

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 2:15 pm	03/03/2026

SVOA, 8270 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
84-74-2	Di-n-butyl phthalate	**0.0841**	J	mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
117-84-0	Di-n-octyl phthalate	**0.0787**	J	mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
122-39-4	Diphenylamine	ND		mg/kg dry	0.112	0.223	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	PADEP-68-04440,NYSDOH-NY10854		
206-44-0	Fluoranthene	**1.87**		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
86-73-7	Fluorene	**0.338**		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
118-74-1	Hexachlorobenzene	**0.105**	J	mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
87-68-3	Hexachlorobutadiene	ND		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
77-47-4	Hexachlorocyclopentadiene	ND	CAL-E, CCVE	mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
67-72-1	Hexachloroethane	**0.185**		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
193-39-5	Indeno(1,2,3-cd)pyrene	**0.291**		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
78-59-1	Isophorone	ND		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
91-20-3	Naphthalene	**1.79**		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
98-95-3	Nitrobenzene	ND		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
62-75-9	N-Nitrosodimethylamine	ND	CCVE	mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
621-64-7	N-nitroso-di-n-propylamine	ND		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
86-30-6	N-Nitrosodiphenylamine	**0.0742**	J	mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
87-86-5	Pentachlorophenol	ND	CAL-E, CCVE	mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
85-01-8	Phenanthrene	**2.08**		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
108-95-2	Phenol	ND		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
129-00-0	Pyrene	**2.64**		mg/kg dry	0.0561	0.112	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
110-86-1	Pyridine	ND		mg/kg dry	0.224	0.448	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		

Sample Information

Client Sample ID: TS-01-S-E2 **Sample ID:** 26C0140-08

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 2:15 pm	03/03/2026

SVOA, 8270 MASTER

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
	Surrogate Recoveries	**Result**			**Acceptance Range**						
367-12-4	*Surrogate: SURR: 2-Fluorophenol*	*23.1 %*			*20-108*						
13127-88-3	*Surrogate: SURR: Phenol-d6*	*27.4 %*			*23-114*						
4165-60-0	*Surrogate: SURR: Nitrobenzene-d5*	*34.9 %*			*22-108*						
321-60-8	*Surrogate: SURR: 2-Fluorobiphenyl*	*29.5 %*			*21-113*						
118-79-6	*Surrogate: SURR: 2,4,6-Tribromophenol*	*30.2 %*			*19-110*						
1718-51-0	*Surrogate: SURR: Terphenyl-d14*	*48.2 %*			*24-116*						

Total Solids

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	* % Solids	**71.6**		%	0.100	0.100	1	SM 2540G	03/04/2026 09:07	03/04/2026 15:05	CD
								Certifications: CTDPH-PH-0840			

Sample Information

Client Sample ID: TS-01-S-E3 **Sample ID:** 26C0140-09

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 2:30 pm	03/03/2026

VOA, 8260 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-55-6	1,1,1-Trichloroethane	ND		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-34-5	1,1,2,2-Tetrachloroethane	ND	QL-02	mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	CCVE	mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-00-5	1,1,2-Trichloroethane	ND		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-34-3	1,1-Dichloroethane	ND		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-35-4	1,1-Dichloroethylene	ND		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-61-6	1,2,3-Trichlorobenzene	ND		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
96-18-4	1,2,3-Trichloropropane	ND		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
120-82-1	1,2,4-Trichlorobenzene	ND		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
95-63-6	1,2,4-Trimethylbenzene	**0.52**		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
96-12-8	1,2-Dibromo-3-chloropropane	ND		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-93-4	1,2-Dibromoethane	ND		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-50-1	1,2-Dichlorobenzene	ND		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-06-2	1,2-Dichloroethane	ND		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-87-5	1,2-Dichloropropane	ND	QL-02	mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-67-8	1,3,5-Trimethylbenzene	**0.15**		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
541-73-1	1,3-Dichlorobenzene	ND		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-46-7	1,4-Dichlorobenzene	ND		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-93-3	2-Butanone	ND		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
591-78-6	2-Hexanone	ND	CCVE	mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: TS-01-S-E3 **Sample ID:** 26C0140-09

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 2:30 pm	03/03/2026

VOA, 8260 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
108-10-1	4-Methyl-2-pentanone	ND	CCVE, QL-02	mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-64-1	Acetone	**0.088**		mg/kg dry	0.0067	0.013	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-02-8	Acrolein	ND	ICVE	mg/kg dry	0.0067	0.013	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-13-1	Acrylonitrile	ND		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-43-2	Benzene	**0.52**		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-97-5	Bromochloromethane	ND		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
75-27-4	Bromodichloromethane	ND		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-25-2	Bromoform	ND		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-83-9	Bromomethane	ND		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-15-0	Carbon disulfide	**0.0044**	J	mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
56-23-5	Carbon tetrachloride	ND		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-90-7	Chlorobenzene	ND		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-00-3	Chloroethane	ND		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-66-3	Chloroform	ND		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-87-3	Chloromethane	ND	CCVE	mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-59-2	cis-1,2-Dichloroethylene	ND		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-01-5	cis-1,3-Dichloropropylene	ND		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
110-82-7	Cyclohexane	ND		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
124-48-1	Dibromochloromethane	ND		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
74-95-3	Dibromomethane	ND		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
75-71-8	Dichlorodifluoromethane	ND		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		

Sample Information

Client Sample ID: TS-01-S-E3 **Sample ID:** 26C0140-09

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 2:30 pm	03/03/2026

VOA, 8260 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
100-41-4	Ethyl Benzene	**0.073**		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-68-3	Hexachlorobutadiene	ND		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
98-82-8	Isopropylbenzene	**0.018**		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-20-9	Methyl acetate	ND		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
1634-04-4	Methyl tert-butyl ether (MTBE)	**0.13**		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-87-2	Methylcyclohexane	**0.042**		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
75-09-2	Methylene chloride	**0.016**		mg/kg dry	0.0067	0.013	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NJDEP-CT005,PADEP-68-0		
104-51-8	n-Butylbenzene	ND	CCVE, QL-02	mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
103-65-1	n-Propylbenzene	**0.044**		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-47-6	o-Xylene	**0.21**		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
179601-23-1	p- & m- Xylenes	**0.32**		mg/kg dry	0.0067	0.013	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
99-87-6	p-Isopropyltoluene	**0.0058**	J, QL-02	mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
135-98-8	sec-Butylbenzene	**0.0079**		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
100-42-5	Styrene	ND		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-65-0	tert-Butyl alcohol (TBA)	ND		mg/kg dry	0.017	0.033	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
98-06-6	tert-Butylbenzene	ND		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
127-18-4	Tetrachloroethylene	ND		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-88-3	Toluene	**0.25**		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-60-5	trans-1,2-Dichloroethylene	ND		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-02-6	trans-1,3-Dichloropropylene	ND		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-01-6	Trichloroethylene	ND		mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: TS-01-S-E3 **Sample ID:** 26C0140-09

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 2:30 pm	03/03/2026

VOA, 8260 MASTER

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-69-4	Trichlorofluoromethane	ND	CCVE	mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-01-4	Vinyl Chloride	ND	CCVE	mg/kg dry	0.0033	0.0067	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
1330-20-7	Xylenes, Total	**0.53**		mg/kg dry	0.010	0.020	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:01	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: SURR: 1,2-Dichloroethane-d4*	*115 %*	*77-125*
2037-26-5	*Surrogate: SURR: Toluene-d8*	*94.3 %*	*85-120*
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*96.4 %*	*76-130*

SVOA, 8270 MASTER

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
92-52-4	1,1-Biphenyl	**0.229**		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		mg/kg dry	0.110	0.221	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
122-66-7	1,2-Diphenylhydrazine (as Azobenzene)	ND		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
58-90-2	2,3,4,6-Tetrachlorophenol	ND		mg/kg dry	0.110	0.221	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
95-95-4	2,4,5-Trichlorophenol	ND		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
88-06-2	2,4,6-Trichlorophenol	ND		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
120-83-2	2,4-Dichlorophenol	ND		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
105-67-9	2,4-Dimethylphenol	ND		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
51-28-5	2,4-Dinitrophenol	ND	CAL-E	mg/kg dry	0.110	0.221	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
121-14-2	2,4-Dinitrotoluene	ND		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
606-20-2	2,6-Dinitrotoluene	ND		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
91-58-7	2-Chloronaphthalene	ND		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
95-57-8	2-Chlorophenol	ND		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		

Sample Information

Client Sample ID: TS-01-S-E3 **Sample ID:** 26C0140-09

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 2:30 pm	03/03/2026

SVOA, 8270 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
91-57-6	2-Methylnaphthalene	**2.70**		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
95-48-7	2-Methylphenol	ND		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
88-74-4	2-Nitroaniline	ND		mg/kg dry	0.110	0.221	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
88-75-5	2-Nitrophenol	ND		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
65794-96-9	* 3- & 4-Methylphenols	ND		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840		
91-94-1	3,3-Dichlorobenzidine	ND		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
99-09-2	3-Nitroaniline	ND		mg/kg dry	0.110	0.221	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
534-52-1	4,6-Dinitro-2-methylphenol	ND	CAL-E	mg/kg dry	0.110	0.221	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
101-55-3	4-Bromophenyl phenyl ether	ND		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
59-50-7	4-Chloro-3-methylphenol	ND		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
106-47-8	4-Chloroaniline	ND		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
7005-72-3	4-Chlorophenyl phenyl ether	ND		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
100-01-6	4-Nitroaniline	ND		mg/kg dry	0.110	0.221	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
100-02-7	4-Nitrophenol	ND	CAL-E	mg/kg dry	0.110	0.221	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
83-32-9	Acenaphthene	**1.87**		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
208-96-8	Acenaphthylene	**0.329**		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
98-86-2	Acetophenone	ND		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
62-53-3	Aniline	ND		mg/kg dry	0.0960	0.442	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
120-12-7	Anthracene	**4.28**		mg/kg dry	1.38	2.76	25	EPA 8270E	03/04/2026 09:04	03/05/2026 18:36	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
1912-24-9	Atrazine	ND		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
100-52-7	Benzaldehyde	ND	CAL-E	mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		

Sample Information

Client Sample ID: TS-01-S-E3 **Sample ID:** 26C0140-09

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 2:30 pm	03/03/2026

SVOA, 8270 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
92-87-5	Benzidine	ND		mg/kg dry	0.221	0.442	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
56-55-3	Benzo(a)anthracene	**5.16**		mg/kg dry	1.38	2.76	25	EPA 8270E	03/04/2026 09:04	03/05/2026 18:36	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
50-32-8	Benzo(a)pyrene	**3.02**		mg/kg dry	1.38	2.76	25	EPA 8270E	03/04/2026 09:04	03/05/2026 18:36	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
205-99-2	Benzo(b)fluoranthene	**2.96**		mg/kg dry	1.38	2.76	25	EPA 8270E	03/04/2026 09:04	03/05/2026 18:36	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
191-24-2	Benzo(g,h,i)perylene	**2.32**	CCVE	mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
207-08-9	Benzo(k)fluoranthene	**2.98**		mg/kg dry	1.38	2.76	25	EPA 8270E	03/04/2026 09:04	03/05/2026 18:36	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
65-85-0	Benzoic acid	ND	CCVE, CAL-E	mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
100-51-6	Benzyl alcohol	ND		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
85-68-7	Benzyl butyl phthalate	**0.548**		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
111-91-1	Bis(2-chloroethoxy)methane	ND		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
111-44-4	Bis(2-chloroethyl)ether	ND		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
108-60-1	Bis(2-chloroisopropyl)ether	ND	CCVE, CAL-E	mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
117-81-7	Bis(2-ethylhexyl)phthalate	**2.44**		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
105-60-2	Caprolactam	ND	CAL-E	mg/kg dry	0.110	0.221	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
86-74-8	Carbazole	**0.904**		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
218-01-9	Chrysene	**5.12**		mg/kg dry	1.38	2.76	25	EPA 8270E	03/04/2026 09:04	03/05/2026 18:36	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
53-70-3	Dibenzo(a,h)anthracene	**0.290**		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
132-64-9	Dibenzofuran	**1.18**		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
84-66-2	Diethyl phthalate	ND		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
131-11-3	Dimethyl phthalate	ND		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
84-74-2	Di-n-butyl phthalate	**0.146**		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		

Sample Information

Client Sample ID: TS-01-S-E3 **Sample ID:** 26C0140-09

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 2:30 pm	03/03/2026

SVOA, 8270 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
117-84-0	Di-n-octyl phthalate	**0.0786**	J	mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
122-39-4	Diphenylamine	ND		mg/kg dry	0.110	0.221	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	PADEP-68-04440,NYSDOH-NY10854		
206-44-0	Fluoranthene	**12.4**		mg/kg dry	1.38	2.76	25	EPA 8270E	03/04/2026 09:04	03/05/2026 18:36	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
86-73-7	Fluorene	**2.95**		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
118-74-1	Hexachlorobenzene	ND		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
87-68-3	Hexachlorobutadiene	ND		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
77-47-4	Hexachlorocyclopentadiene	ND	CCVE, CAL-E	mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
67-72-1	Hexachloroethane	ND		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
193-39-5	Indeno(1,2,3-cd)pyrene	**2.76**		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
78-59-1	Isophorone	ND		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
91-20-3	Naphthalene	**4.28**		mg/kg dry	1.38	2.76	25	EPA 8270E	03/04/2026 09:04	03/05/2026 18:36	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
98-95-3	Nitrobenzene	ND		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
62-75-9	N-Nitrosodimethylamine	ND	CCVE	mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
621-64-7	N-nitroso-di-n-propylamine	ND		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
86-30-6	N-Nitrosodiphenylamine	ND		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
87-86-5	Pentachlorophenol	ND	CCVE, CAL-E	mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
85-01-8	Phenanthrene	**12.0**		mg/kg dry	1.38	2.76	25	EPA 8270E	03/04/2026 09:04	03/05/2026 18:36	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
108-95-2	Phenol	ND		mg/kg dry	0.0553	0.110	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
129-00-0	Pyrene	**12.6**		mg/kg dry	1.38	2.76	25	EPA 8270E	03/04/2026 09:04	03/05/2026 18:36	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
110-86-1	Pyridine	ND		mg/kg dry	0.221	0.442	1	EPA 8270E	03/04/2026 09:04	03/05/2026 02:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		

	Surrogate Recoveries	Result	Acceptance Range
367-12-4	*Surrogate: SURR: 2-Fluorophenol*	*28.2 %*	*20-108*
13127-88-3	*Surrogate: SURR: Phenol-d6*	*29.7 %*	*23-114*

Sample Information

Client Sample ID: TS-01-S-E3 **Sample ID:** 26C0140-09

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 2:30 pm	03/03/2026

SVOA, 8270 MASTER

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
4165-60-0	*Surrogate: SURR: Nitrobenzene-d5*	*40.8 %*			*22-108*						
321-60-8	*Surrogate: SURR: 2-Fluorobiphenyl*	*35.7 %*			*21-113*						
118-79-6	*Surrogate: SURR: 2,4,6-Tribromophenol*	*33.8 %*			*19-110*						
1718-51-0	*Surrogate: SURR: Terphenyl-d14*	*49.3 %*			*24-116*						

Total Solids

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	* % Solids	**75.5**		%	0.100	0.100	1	SM 2540G	03/04/2026 09:07	03/04/2026 15:05	CD
								Certifications: CTDPH-PH-0840			

Sample Information

Client Sample ID: TS-01-S-E4 **Sample ID:** 26C0140-10

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 2:45 pm	03/03/2026

VOA, 8260 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-55-6	1,1,1-Trichloroethane	ND		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-34-5	1,1,2,2-Tetrachloroethane	ND	QL-02	mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	CCVE	mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-00-5	1,1,2-Trichloroethane	ND		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-34-3	1,1-Dichloroethane	ND		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-35-4	1,1-Dichloroethylene	ND		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-61-6	1,2,3-Trichlorobenzene	ND		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
96-18-4	1,2,3-Trichloropropane	ND		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
120-82-1	1,2,4-Trichlorobenzene	ND		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
95-63-6	1,2,4-Trimethylbenzene	**0.40**		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
96-12-8	1,2-Dibromo-3-chloropropane	ND		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-93-4	1,2-Dibromoethane	ND		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-50-1	1,2-Dichlorobenzene	ND		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-06-2	1,2-Dichloroethane	ND		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-87-5	1,2-Dichloropropane	ND	QL-02	mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-67-8	1,3,5-Trimethylbenzene	**0.13**		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
541-73-1	1,3-Dichlorobenzene	ND		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-46-7	1,4-Dichlorobenzene	ND		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-93-3	2-Butanone	**0.038**		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
591-78-6	2-Hexanone	ND	CCVE	mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: TS-01-S-E4 **Sample ID:** 26C0140-10

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 2:45 pm	03/03/2026

VOA, 8260 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
108-10-1	4-Methyl-2-pentanone	ND	QL-02, CCVE	mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-64-1	Acetone	**0.29**		mg/kg dry	0.0076	0.015	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-02-8	Acrolein	ND	ICVE	mg/kg dry	0.0076	0.015	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-13-1	Acrylonitrile	ND		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-43-2	Benzene	**0.24**		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-97-5	Bromochloromethane	ND		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
75-27-4	Bromodichloromethane	ND		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-25-2	Bromoform	ND		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-83-9	Bromomethane	ND		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-15-0	Carbon disulfide	**0.049**		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
56-23-5	Carbon tetrachloride	ND		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-90-7	Chlorobenzene	ND		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-00-3	Chloroethane	ND		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-66-3	Chloroform	ND		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-87-3	Chloromethane	ND	CCVE	mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-59-2	cis-1,2-Dichloroethylene	ND		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-01-5	cis-1,3-Dichloropropylene	ND		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
110-82-7	Cyclohexane	**0.055**		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
124-48-1	Dibromochloromethane	ND		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
74-95-3	Dibromomethane	ND		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
75-71-8	Dichlorodifluoromethane	ND		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		

Sample Information

Client Sample ID: TS-01-S-E4 **Sample ID:** 26C0140-10

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 2:45 pm	03/03/2026

VOA, 8260 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
100-41-4	Ethyl Benzene	**0.055**		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-68-3	Hexachlorobutadiene	ND		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
98-82-8	Isopropylbenzene	**0.014**		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-20-9	Methyl acetate	ND		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
1634-04-4	Methyl tert-butyl ether (MTBE)	**0.043**		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-87-2	Methylcyclohexane	**0.040**		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
75-09-2	Methylene chloride	**0.016**		mg/kg dry	0.0076	0.015	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NJDEP-CT005,PADEP-68-0		
104-51-8	n-Butylbenzene	**0.021**	QL-02, CCVE	mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
103-65-1	n-Propylbenzene	**0.030**		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-47-6	o-Xylene	**0.17**		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
179601-23-1	p- & m- Xylenes	**0.24**		mg/kg dry	0.0076	0.015	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
99-87-6	p-Isopropyltoluene	**0.0041**	J, QL-02	mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
135-98-8	sec-Butylbenzene	**0.0062**	J	mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
100-42-5	Styrene	ND		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-65-0	tert-Butyl alcohol (TBA)	**0.14**		mg/kg dry	0.019	0.038	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
98-06-6	tert-Butylbenzene	ND		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
127-18-4	Tetrachloroethylene	ND		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-88-3	Toluene	**0.16**		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-60-5	trans-1,2-Dichloroethylene	ND		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-02-6	trans-1,3-Dichloropropylene	ND		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-01-6	Trichloroethylene	ND		mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: TS-01-S-E4 **Sample ID:** 26C0140-10

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 2:45 pm	03/03/2026

VOA, 8260 MASTER

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-69-4	Trichlorofluoromethane	ND	CCVE	mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-01-4	Vinyl Chloride	ND	CCVE	mg/kg dry	0.0038	0.0076	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
1330-20-7	Xylenes, Total	**0.41**		mg/kg dry	0.011	0.023	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: SURR: 1,2-Dichloroethane-d4*	*112 %*	*77-125*
2037-26-5	*Surrogate: SURR: Toluene-d8*	*93.9 %*	*85-120*
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*94.6 %*	*76-130*

SVOA, 8270 MASTER

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
92-52-4	1,1-Biphenyl	**0.520**		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		mg/kg dry	0.122	0.244	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
122-66-7	1,2-Diphenylhydrazine (as Azobenzene)	ND		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
58-90-2	2,3,4,6-Tetrachlorophenol	ND		mg/kg dry	0.122	0.244	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
95-95-4	2,4,5-Trichlorophenol	ND		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
88-06-2	2,4,6-Trichlorophenol	ND		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
120-83-2	2,4-Dichlorophenol	ND		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
105-67-9	2,4-Dimethylphenol	ND		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
51-28-5	2,4-Dinitrophenol	ND	CAL-E	mg/kg dry	0.122	0.244	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
121-14-2	2,4-Dinitrotoluene	ND		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
606-20-2	2,6-Dinitrotoluene	ND		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
91-58-7	2-Chloronaphthalene	ND		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
95-57-8	2-Chlorophenol	ND		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		

Sample Information

Client Sample ID: TS-01-S-E4 **Sample ID:** 26C0140-10

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 2:45 pm	03/03/2026

SVOA, 8270 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
91-57-6	2-Methylnaphthalene	**11.9**		mg/kg dry	1.53	3.06	25	EPA 8270E	03/04/2026 09:04	03/05/2026 19:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
95-48-7	2-Methylphenol	ND		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
88-74-4	2-Nitroaniline	ND		mg/kg dry	0.122	0.244	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
88-75-5	2-Nitrophenol	ND		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
65794-96-9	* 3- & 4-Methylphenols	ND		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840		
91-94-1	3,3-Dichlorobenzidine	ND		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
99-09-2	3-Nitroaniline	ND		mg/kg dry	0.122	0.244	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
534-52-1	4,6-Dinitro-2-methylphenol	ND	CAL-E	mg/kg dry	0.122	0.244	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
101-55-3	4-Bromophenyl phenyl ether	ND		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
59-50-7	4-Chloro-3-methylphenol	ND		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
106-47-8	4-Chloroaniline	ND		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
7005-72-3	4-Chlorophenyl phenyl ether	ND		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
100-01-6	4-Nitroaniline	ND		mg/kg dry	0.122	0.244	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
100-02-7	4-Nitrophenol	ND	CAL-E	mg/kg dry	0.122	0.244	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
83-32-9	Acenaphthene	**0.673**		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
208-96-8	Acenaphthylene	**1.24**		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
98-86-2	Acetophenone	ND		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
62-53-3	Aniline	ND		mg/kg dry	0.106	0.490	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
120-12-7	Anthracene	**1.36**		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
1912-24-9	Atrazine	ND		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
100-52-7	Benzaldehyde	ND	CAL-E	mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		

Sample Information

Client Sample ID: TS-01-S-E4 **Sample ID:** 26C0140-10

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 2:45 pm	03/03/2026

SVOA, 8270 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
92-87-5	Benzidine	ND		mg/kg dry	0.245	0.490	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
56-55-3	Benzo(a)anthracene	**2.21**		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
50-32-8	Benzo(a)pyrene	**1.47**		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
205-99-2	Benzo(b)fluoranthene	**1.39**		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
191-24-2	Benzo(g,h,i)perylene	**0.607**	CCVE	mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
207-08-9	Benzo(k)fluoranthene	**1.20**		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
65-85-0	Benzoic acid	ND	CAL-E, CCVE	mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
100-51-6	Benzyl alcohol	ND		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
85-68-7	Benzyl butyl phthalate	**0.704**		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
111-91-1	Bis(2-chloroethoxy)methane	ND		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
111-44-4	Bis(2-chloroethyl)ether	ND		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
108-60-1	Bis(2-chloroisopropyl)ether	ND	CAL-E, CCVE	mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
117-81-7	Bis(2-ethylhexyl)phthalate	**1.30**		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
105-60-2	Caprolactam	ND	CAL-E	mg/kg dry	0.122	0.244	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
86-74-8	Carbazole	**0.309**		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
218-01-9	Chrysene	**2.02**		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
53-70-3	Dibenzo(a,h)anthracene	ND		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
132-64-9	Dibenzofuran	ND		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
84-66-2	Diethyl phthalate	ND		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
131-11-3	Dimethyl phthalate	ND		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
84-74-2	Di-n-butyl phthalate	ND		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		

Sample Information

Client Sample ID: TS-01-S-E4 **Sample ID:** 26C0140-10

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 2:45 pm	03/03/2026

SVOA, 8270 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
117-84-0	Di-n-octyl phthalate	**0.116**	J	mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
122-39-4	Diphenylamine	ND		mg/kg dry	0.122	0.244	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	PADEP-68-04440,NYSDOH-NY10854		
206-44-0	Fluoranthene	**5.55**		mg/kg dry	1.53	3.06	25	EPA 8270E	03/04/2026 09:04	03/05/2026 19:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
86-73-7	Fluorene	**2.02**		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
118-74-1	Hexachlorobenzene	ND		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
87-68-3	Hexachlorobutadiene	ND		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
77-47-4	Hexachlorocyclopentadiene	ND	CCVE, CAL-E	mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
67-72-1	Hexachloroethane	ND		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
193-39-5	Indeno(1,2,3-cd)pyrene	**0.599**		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
78-59-1	Isophorone	ND		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
91-20-3	Naphthalene	**25.8**		mg/kg dry	1.53	3.06	25	EPA 8270E	03/04/2026 09:04	03/05/2026 19:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
98-95-3	Nitrobenzene	ND		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
62-75-9	N-Nitrosodimethylamine	ND	CCVE	mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
621-64-7	N-nitroso-di-n-propylamine	ND		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
86-30-6	N-Nitrosodiphenylamine	ND		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
87-86-5	Pentachlorophenol	ND	CCVE, CAL-E	mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
85-01-8	Phenanthrene	**6.21**		mg/kg dry	1.53	3.06	25	EPA 8270E	03/04/2026 09:04	03/05/2026 19:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
108-95-2	Phenol	ND		mg/kg dry	0.0613	0.122	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
129-00-0	Pyrene	**5.89**		mg/kg dry	1.53	3.06	25	EPA 8270E	03/04/2026 09:04	03/05/2026 19:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
110-86-1	Pyridine	ND		mg/kg dry	0.245	0.490	1	EPA 8270E	03/04/2026 09:04	03/05/2026 03:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		

	Surrogate Recoveries	Result		Acceptance Range
367-12-4	*Surrogate: SURR: 2-Fluorophenol*	*19.8 %*	S-08	*20-108*
13127-88-3	*Surrogate: SURR: Phenol-d6*	*24.3 %*		*23-114*

Sample Information

Client Sample ID: TS-01-S-E4 **Sample ID:** 26C0140-10

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 2:45 pm	03/03/2026

SVOA, 8270 MASTER

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
4165-60-0	*Surrogate: SURR: Nitrobenzene-d5*	*27.3 %*			*22-108*						
321-60-8	*Surrogate: SURR: 2-Fluorobiphenyl*	*28.8 %*			*21-113*						
118-79-6	*Surrogate: SURR: 2,4,6-Tribromophenol*	*18.7 %*	S-08		*19-110*						
1718-51-0	*Surrogate: SURR: Terphenyl-d14*	*37.5 %*			*24-116*						

Total Solids

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	* % Solids	**64.0**		%	0.100	0.100	1	SM 2540G	03/04/2026 09:07	03/04/2026 15:05	CD
								Certifications: CTDPH-PH-0840			

Sample Information

Client Sample ID: TS-01-S-E5 **Sample ID:** 26C0140-11

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 3:00 pm	03/03/2026

VOA, 8260 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-55-6	1,1,1-Trichloroethane	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-34-5	1,1,2,2-Tetrachloroethane	ND	QL-02	mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	CCVE	mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-00-5	1,1,2-Trichloroethane	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-34-3	1,1-Dichloroethane	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-35-4	1,1-Dichloroethylene	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-61-6	1,2,3-Trichlorobenzene	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
96-18-4	1,2,3-Trichloropropane	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
120-82-1	1,2,4-Trichlorobenzene	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
95-63-6	1,2,4-Trimethylbenzene	**0.31**		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
96-12-8	1,2-Dibromo-3-chloropropane	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-93-4	1,2-Dibromoethane	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-50-1	1,2-Dichlorobenzene	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-06-2	1,2-Dichloroethane	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-87-5	1,2-Dichloropropane	ND	QL-02	mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-67-8	1,3,5-Trimethylbenzene	**0.099**		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
541-73-1	1,3-Dichlorobenzene	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-46-7	1,4-Dichlorobenzene	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-93-3	2-Butanone	**0.028**		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
591-78-6	2-Hexanone	ND	CCVE	mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: TS-01-S-E5 **Sample ID:** 26C0140-11

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 3:00 pm	03/03/2026

VOA, 8260 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
108-10-1	4-Methyl-2-pentanone	ND	QL-02, CCVE	mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-64-1	Acetone	**0.21**		mg/kg dry	0.0058	0.012	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-02-8	Acrolein	ND	ICVE	mg/kg dry	0.0058	0.012	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-13-1	Acrylonitrile	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-43-2	Benzene	**0.21**		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-97-5	Bromochloromethane	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
75-27-4	Bromodichloromethane	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-25-2	Bromoform	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-83-9	Bromomethane	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-15-0	Carbon disulfide	**0.028**		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
56-23-5	Carbon tetrachloride	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-90-7	Chlorobenzene	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-00-3	Chloroethane	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-66-3	Chloroform	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-87-3	Chloromethane	ND	CCVE	mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-59-2	cis-1,2-Dichloroethylene	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-01-5	cis-1,3-Dichloropropylene	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
110-82-7	Cyclohexane	**0.026**		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
124-48-1	Dibromochloromethane	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
74-95-3	Dibromomethane	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
75-71-8	Dichlorodifluoromethane	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		

Sample Information

Client Sample ID: TS-01-S-E5 **Sample ID:** 26C0140-11

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 3:00 pm	03/03/2026

VOA, 8260 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
100-41-4	Ethyl Benzene	**0.040**		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-68-3	Hexachlorobutadiene	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
98-82-8	Isopropylbenzene	**0.011**		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-20-9	Methyl acetate	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
1634-04-4	Methyl tert-butyl ether (MTBE)	**0.025**		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-87-2	Methylcyclohexane	**0.021**		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
75-09-2	Methylene chloride	**0.015**		mg/kg dry	0.0058	0.012	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NJDEP-CT005,PADEP-68-0		
104-51-8	n-Butylbenzene	ND	QL-02, CCVE	mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
103-65-1	n-Propylbenzene	**0.025**		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-47-6	o-Xylene	**0.12**		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
179601-23-1	p- & m- Xylenes	**0.18**		mg/kg dry	0.0058	0.012	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
99-87-6	p-Isopropyltoluene	**0.0031**	J, QL-02	mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
135-98-8	sec-Butylbenzene	**0.0054**	J	mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
100-42-5	Styrene	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-65-0	tert-Butyl alcohol (TBA)	**0.10**		mg/kg dry	0.015	0.029	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
98-06-6	tert-Butylbenzene	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
127-18-4	Tetrachloroethylene	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-88-3	Toluene	**0.10**		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-60-5	trans-1,2-Dichloroethylene	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-02-6	trans-1,3-Dichloropropylene	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-01-6	Trichloroethylene	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: TS-01-S-E5 **Sample ID:** 26C0140-11

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 3:00 pm	03/03/2026

VOA, 8260 MASTER

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-69-4	Trichlorofluoromethane	ND	CCVE	mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-01-4	Vinyl Chloride	ND	CCVE	mg/kg dry	0.0029	0.0058	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
1330-20-7	Xylenes, Total	**0.30**		mg/kg dry	0.0087	0.017	1	EPA 8260D	03/09/2026 10:05	03/10/2026 13:56	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: SURR: 1,2-Dichloroethane-d4*	*110 %*	*77-125*
2037-26-5	*Surrogate: SURR: Toluene-d8*	*94.4 %*	*85-120*
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*94.9 %*	*76-130*

SVOA, 8270 MASTER

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
92-52-4	1,1-Biphenyl	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		mg/kg dry	5.87	11.7	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
122-66-7	1,2-Diphenylhydrazine (as Azobenzene)	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
58-90-2	2,3,4,6-Tetrachlorophenol	ND		mg/kg dry	5.87	11.7	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
95-95-4	2,4,5-Trichlorophenol	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
88-06-2	2,4,6-Trichlorophenol	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
120-83-2	2,4-Dichlorophenol	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
105-67-9	2,4-Dimethylphenol	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
51-28-5	2,4-Dinitrophenol	ND	CAL-E	mg/kg dry	5.87	11.7	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
121-14-2	2,4-Dinitrotoluene	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
606-20-2	2,6-Dinitrotoluene	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
91-58-7	2-Chloronaphthalene	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
95-57-8	2-Chlorophenol	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		

Sample Information

Client Sample ID: TS-01-S-E5 **Sample ID:** 26C0140-11

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 3:00 pm	03/03/2026

SVOA, 8270 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
91-57-6	2-Methylnaphthalene	**29.7**		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
95-48-7	2-Methylphenol	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
88-74-4	2-Nitroaniline	ND		mg/kg dry	5.87	11.7	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
88-75-5	2-Nitrophenol	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
65794-96-9	* 3- & 4-Methylphenols	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840		
91-94-1	3,3-Dichlorobenzidine	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
99-09-2	3-Nitroaniline	ND		mg/kg dry	5.87	11.7	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
534-52-1	4,6-Dinitro-2-methylphenol	ND	CAL-E	mg/kg dry	5.87	11.7	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
101-55-3	4-Bromophenyl phenyl ether	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
59-50-7	4-Chloro-3-methylphenol	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
106-47-8	4-Chloroaniline	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
7005-72-3	4-Chlorophenyl phenyl ether	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
100-01-6	4-Nitroaniline	ND		mg/kg dry	5.87	11.7	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
100-02-7	4-Nitrophenol	ND	CAL-E	mg/kg dry	5.87	11.7	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
83-32-9	Acenaphthene	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
208-96-8	Acenaphthylene	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
98-86-2	Acetophenone	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
62-53-3	Aniline	ND		mg/kg dry	5.10	23.5	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
120-12-7	Anthracene	**2.96**	J	mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
1912-24-9	Atrazine	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
100-52-7	Benzaldehyde	ND	CAL-E	mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		

Sample Information

Client Sample ID: TS-01-S-E5 **Sample ID:** 26C0140-11

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 3:00 pm	03/03/2026

SVOA, 8270 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
92-87-5	Benzidine	ND		mg/kg dry	11.8	23.5	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
56-55-3	Benzo(a)anthracene	**4.18**	J	mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
50-32-8	Benzo(a)pyrene	**3.19**	J	mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
205-99-2	Benzo(b)fluoranthene	**3.01**	J	mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
191-24-2	Benzo(g,h,i)perylene	ND	CCVE	mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
207-08-9	Benzo(k)fluoranthene	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
65-85-0	Benzoic acid	ND	CAL-E, CCVE	mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
100-51-6	Benzyl alcohol	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
85-68-7	Benzyl butyl phthalate	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
111-91-1	Bis(2-chloroethoxy)methane	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
111-44-4	Bis(2-chloroethyl)ether	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
108-60-1	Bis(2-chloroisopropyl)ether	ND	CAL-E, CCVE	mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
117-81-7	Bis(2-ethylhexyl)phthalate	**3.10**	J	mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
105-60-2	Caprolactam	ND	CAL-E	mg/kg dry	5.87	11.7	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
86-74-8	Carbazole	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
218-01-9	Chrysene	**3.57**	J	mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
53-70-3	Dibenzo(a,h)anthracene	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
132-64-9	Dibenzofuran	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
84-66-2	Diethyl phthalate	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
131-11-3	Dimethyl phthalate	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
84-74-2	Di-n-butyl phthalate	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		

Sample Information

Client Sample ID: TS-01-S-E5 **Sample ID:** 26C0140-11

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 3:00 pm	03/03/2026

SVOA, 8270 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
117-84-0	Di-n-octyl phthalate	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
122-39-4	Diphenylamine	ND		mg/kg dry	5.87	11.7	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	PADEP-68-04440,NYSDOH-NY10854		
206-44-0	Fluoranthene	**7.18**		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
86-73-7	Fluorene	**5.12**	J	mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
118-74-1	Hexachlorobenzene	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
87-68-3	Hexachlorobutadiene	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
77-47-4	Hexachlorocyclopentadiene	ND	CAL-E, CCVE	mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
67-72-1	Hexachloroethane	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
193-39-5	Indeno(1,2,3-cd)pyrene	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
78-59-1	Isophorone	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
91-20-3	Naphthalene	**62.4**		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
98-95-3	Nitrobenzene	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
62-75-9	N-Nitrosodimethylamine	ND	CCVE	mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
621-64-7	N-nitroso-di-n-propylamine	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
86-30-6	N-Nitrosodiphenylamine	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
87-86-5	Pentachlorophenol	ND	CAL-E, CCVE	mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
85-01-8	Phenanthrene	**11.3**		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
108-95-2	Phenol	ND		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
129-00-0	Pyrene	**8.17**		mg/kg dry	2.94	5.87	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
110-86-1	Pyridine	ND	CCVE	mg/kg dry	11.8	23.5	50	EPA 8270E	03/04/2026 09:04	03/05/2026 16:06	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		

Surrogate Recoveries	Result	Acceptance Range

Sample Information

Client Sample ID: TS-01-S-E5 **Sample ID:** 26C0140-11

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 3:00 pm	03/03/2026

SVOA, 8270 MASTER

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
367-12-4	*Surrogate: SURR: 2-Fluorophenol*	*%*	S-08		*20-108*						
13127-88-3	*Surrogate: SURR: Phenol-d6*	*19.0 %*	S-08		*23-114*						
4165-60-0	*Surrogate: SURR: Nitrobenzene-d5*	*48.0 %*			*22-108*						
321-60-8	*Surrogate: SURR: 2-Fluorobiphenyl*	*36.0 %*			*21-113*						
118-79-6	*Surrogate: SURR: 2,4,6-Tribromophenol*	*%*	S-08		*19-110*						
1718-51-0	*Surrogate: SURR: Terphenyl-d14*	*%*	S-08		*24-116*						

Total Solids

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	* % Solids	**70.9**		%	0.100	0.100	1	SM 2540G	03/04/2026 09:07	03/04/2026 15:05	CD
								Certifications: CTDPH-PH-0840			

Sample Information

Client Sample ID: TS-01-S-E6 **Sample ID:** 26C0140-12

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 3:15 pm	03/03/2026

VOA, 8260 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-55-6	1,1,1-Trichloroethane	ND		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-34-5	1,1,2,2-Tetrachloroethane	ND		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-00-5	1,1,2-Trichloroethane	ND		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-34-3	1,1-Dichloroethane	ND		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-35-4	1,1-Dichloroethylene	ND		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-61-6	1,2,3-Trichlorobenzene	ND		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
96-18-4	1,2,3-Trichloropropane	ND		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
120-82-1	1,2,4-Trichlorobenzene	ND		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
95-63-6	1,2,4-Trimethylbenzene	**0.42**		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
96-12-8	1,2-Dibromo-3-chloropropane	ND		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-93-4	1,2-Dibromoethane	ND		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-50-1	1,2-Dichlorobenzene	ND		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-06-2	1,2-Dichloroethane	**0.0086**		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-87-5	1,2-Dichloropropane	ND	QL-02	mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-67-8	1,3,5-Trimethylbenzene	**0.14**		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
541-73-1	1,3-Dichlorobenzene	ND		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-46-7	1,4-Dichlorobenzene	ND		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-93-3	2-Butanone	**0.037**		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
591-78-6	2-Hexanone	ND		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: TS-01-S-E6 **Sample ID:** 26C0140-12

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 3:15 pm	03/03/2026

VOA, 8260 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
108-10-1	4-Methyl-2-pentanone	ND		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-64-1	Acetone	**0.32**		mg/kg dry	0.0075	0.015	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-02-8	Acrolein	ND	ICVE	mg/kg dry	0.0075	0.015	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-13-1	Acrylonitrile	ND		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-43-2	Benzene	**0.26**		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-97-5	Bromochloromethane	ND		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
75-27-4	Bromodichloromethane	ND		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-25-2	Bromoform	ND		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-83-9	Bromomethane	ND		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-15-0	Carbon disulfide	**0.037**		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
56-23-5	Carbon tetrachloride	ND		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-90-7	Chlorobenzene	ND		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-00-3	Chloroethane	ND		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-66-3	Chloroform	ND		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-87-3	Chloromethane	ND	CCVE	mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-59-2	cis-1,2-Dichloroethylene	ND		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-01-5	cis-1,3-Dichloropropylene	ND		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
110-82-7	Cyclohexane	**0.049**		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
124-48-1	Dibromochloromethane	ND		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
74-95-3	Dibromomethane	ND		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
75-71-8	Dichlorodifluoromethane	ND		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		

Sample Information

Client Sample ID: TS-01-S-E6 **Sample ID:** 26C0140-12

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 3:15 pm	03/03/2026

VOA, 8260 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
100-41-4	Ethyl Benzene	**0.053**		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-68-3	Hexachlorobutadiene	ND		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
98-82-8	Isopropylbenzene	**0.013**		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-20-9	Methyl acetate	ND		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
1634-04-4	Methyl tert-butyl ether (MTBE)	**0.028**		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-87-2	Methylcyclohexane	**0.037**		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
75-09-2	Methylene chloride	**0.027**		mg/kg dry	0.0075	0.015	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NJDEP-CT005,PADEP-68-0		
104-51-8	n-Butylbenzene	**0.022**	QL-02	mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
103-65-1	n-Propylbenzene	**0.028**		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-47-6	o-Xylene	**0.19**		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
179601-23-1	p- & m- Xylenes	**0.26**		mg/kg dry	0.0075	0.015	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
99-87-6	p-Isopropyltoluene	**0.0045**	J, QL-02	mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
135-98-8	sec-Butylbenzene	**0.0064**	J	mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
100-42-5	Styrene	ND		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-65-0	tert-Butyl alcohol (TBA)	**0.12**	CCVE	mg/kg dry	0.019	0.038	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
98-06-6	tert-Butylbenzene	ND		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
127-18-4	Tetrachloroethylene	ND		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-88-3	Toluene	**0.15**		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-60-5	trans-1,2-Dichloroethylene	ND		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-02-6	trans-1,3-Dichloropropylene	ND		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-01-6	Trichloroethylene	ND		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: TS-01-S-E6 **Sample ID:** 26C0140-12

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 3:15 pm	03/03/2026

VOA, 8260 MASTER

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-69-4	Trichlorofluoromethane	ND		mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-01-4	Vinyl Chloride	ND	CCVE	mg/kg dry	0.0038	0.0075	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
1330-20-7	Xylenes, Total	**0.45**		mg/kg dry	0.011	0.023	1	EPA 8260D	03/11/2026 07:00	03/11/2026 18:07	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: SURR: 1,2-Dichloroethane-d4*	*115 %*	*77-125*
2037-26-5	*Surrogate: SURR: Toluene-d8*	*91.0 %*	*85-120*
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*90.7 %*	*76-130*

SVOA, 8270 MASTER

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
92-52-4	1,1-Biphenyl	ND		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		mg/kg dry	2.37	4.74	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
122-66-7	1,2-Diphenylhydrazine (as Azobenzene)	ND		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
58-90-2	2,3,4,6-Tetrachlorophenol	ND		mg/kg dry	2.37	4.74	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
95-95-4	2,4,5-Trichlorophenol	ND		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
88-06-2	2,4,6-Trichlorophenol	ND		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
120-83-2	2,4-Dichlorophenol	ND		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
105-67-9	2,4-Dimethylphenol	ND		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
51-28-5	2,4-Dinitrophenol	ND	CAL-E	mg/kg dry	2.37	4.74	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
121-14-2	2,4-Dinitrotoluene	ND		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
606-20-2	2,6-Dinitrotoluene	ND		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
91-58-7	2-Chloronaphthalene	ND		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
95-57-8	2-Chlorophenol	ND		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		

Sample Information

Client Sample ID: TS-01-S-E6 **Sample ID:** 26C0140-12

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 3:15 pm	03/03/2026

SVOA, 8270 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
91-57-6	2-Methylnaphthalene	**9.30**		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
95-48-7	2-Methylphenol	ND		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
88-74-4	2-Nitroaniline	ND		mg/kg dry	2.37	4.74	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
88-75-5	2-Nitrophenol	ND		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
65794-96-9	* 3- & 4-Methylphenols	ND		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840		
91-94-1	3,3-Dichlorobenzidine	ND		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
99-09-2	3-Nitroaniline	ND		mg/kg dry	2.37	4.74	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
534-52-1	4,6-Dinitro-2-methylphenol	ND	CAL-E	mg/kg dry	2.37	4.74	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
101-55-3	4-Bromophenyl phenyl ether	ND		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
59-50-7	4-Chloro-3-methylphenol	ND		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
106-47-8	4-Chloroaniline	ND		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
7005-72-3	4-Chlorophenyl phenyl ether	ND		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
100-01-6	4-Nitroaniline	ND		mg/kg dry	2.37	4.74	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
100-02-7	4-Nitrophenol	ND	CAL-E	mg/kg dry	2.37	4.74	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
83-32-9	Acenaphthene	**1.92**	J	mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
208-96-8	Acenaphthylene	ND		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
98-86-2	Acetophenone	ND		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
62-53-3	Aniline	ND		mg/kg dry	2.06	9.51	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
120-12-7	Anthracene	**2.85**		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
1912-24-9	Atrazine	ND		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
100-52-7	Benzaldehyde	ND	CAL-E	mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		

Sample Information

Client Sample ID: TS-01-S-E6 **Sample ID:** 26C0140-12

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 3:15 pm	03/03/2026

SVOA, 8270 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
92-87-5	Benzidine	ND		mg/kg dry	4.76	9.51	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
56-55-3	Benzo(a)anthracene	**3.25**		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
50-32-8	Benzo(a)pyrene	**2.70**		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
205-99-2	Benzo(b)fluoranthene	**2.41**		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
191-24-2	Benzo(g,h,i)perylene	ND	CCVE	mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
207-08-9	Benzo(k)fluoranthene	**2.26**	J	mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
65-85-0	Benzoic acid	ND	CAL-E, CCVE	mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
100-51-6	Benzyl alcohol	ND		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
85-68-7	Benzyl butyl phthalate	**1.23**	J	mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
111-91-1	Bis(2-chloroethoxy)methane	ND		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
111-44-4	Bis(2-chloroethyl)ether	ND		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
108-60-1	Bis(2-chloroisopropyl)ether	ND	CAL-E, CCVE	mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
117-81-7	Bis(2-ethylhexyl)phthalate	**3.51**		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
105-60-2	Caprolactam	ND	CAL-E	mg/kg dry	2.37	4.74	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
86-74-8	Carbazole	ND		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
218-01-9	Chrysene	**3.40**		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
53-70-3	Dibenzo(a,h)anthracene	ND		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
132-64-9	Dibenzofuran	**1.42**	J	mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
84-66-2	Diethyl phthalate	ND		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
131-11-3	Dimethyl phthalate	ND		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
84-74-2	Di-n-butyl phthalate	ND		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		

Sample Information

Client Sample ID: TS-01-S-E6 **Sample ID:** 26C0140-12

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 3:15 pm	03/03/2026

SVOA, 8270 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
117-84-0	Di-n-octyl phthalate	ND		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
122-39-4	Diphenylamine	ND		mg/kg dry	2.37	4.74	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	PADEP-68-04440,NYSDOH-NY10854		
206-44-0	Fluoranthene	**8.62**		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
86-73-7	Fluorene	**2.56**		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
118-74-1	Hexachlorobenzene	ND		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
87-68-3	Hexachlorobutadiene	ND		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
77-47-4	Hexachlorocyclopentadiene	ND	CAL-E, CCVE	mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
67-72-1	Hexachloroethane	ND		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
193-39-5	Indeno(1,2,3-cd)pyrene	ND		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
78-59-1	Isophorone	ND		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
91-20-3	Naphthalene	**19.4**		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
98-95-3	Nitrobenzene	ND		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
62-75-9	N-Nitrosodimethylamine	ND	CCVE	mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
621-64-7	N-nitroso-di-n-propylamine	ND		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
86-30-6	N-Nitrosodiphenylamine	ND		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
87-86-5	Pentachlorophenol	ND	CAL-E, CCVE	mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
85-01-8	Phenanthrene	**9.99**		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
108-95-2	Phenol	ND		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
129-00-0	Pyrene	**8.24**		mg/kg dry	1.19	2.37	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
110-86-1	Pyridine	ND	CCVE	mg/kg dry	4.76	9.51	20	EPA 8270E	03/04/2026 09:04	03/05/2026 16:35	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		

Surrogate Recoveries	Result	Acceptance Range

Sample Information

Client Sample ID: TS-01-S-E6 **Sample ID:** 26C0140-12

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26C0140	170197605	Soil	March 3, 2026 3:15 pm	03/03/2026

SVOA, 8270 MASTER

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
367-12-4	*Surrogate: SURR: 2-Fluorophenol*	*10.8 %*	S-08		*20-108*						
13127-88-3	*Surrogate: SURR: Phenol-d6*	*8.80 %*	S-08		*23-114*						
4165-60-0	*Surrogate: SURR: Nitrobenzene-d5*	*24.8 %*			*22-108*						
321-60-8	*Surrogate: SURR: 2-Fluorobiphenyl*	*39.2 %*			*21-113*						
118-79-6	*Surrogate: SURR: 2,4,6-Tribromophenol*	*20.4 %*			*19-110*						
1718-51-0	*Surrogate: SURR: Terphenyl-d14*	*44.0 %*			*24-116*						

Total Solids

Log-in Notes:

Sample Notes:

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	* % Solids	**70.2**		%	0.100	0.100	1	SM 2540G	03/04/2026 09:07	03/04/2026 15:05	CD
								Certifications: CTDPH-PH-0840			

Analytical Batch Summary

Batch ID: BC60159 **Preparation Method:** EPA 3550C **Prepared By:** JLM

Sample ID	Client Sample ID	Preparation Date
26C0140-07	TS-01-S-E1	03/04/26
26C0140-08	TS-01-S-E2	03/04/26
26C0140-09	TS-01-S-E3	03/04/26
26C0140-09RE1	TS-01-S-E3	03/04/26
26C0140-10	TS-01-S-E4	03/04/26
26C0140-10RE1	TS-01-S-E4	03/04/26
26C0140-11	TS-01-S-E5	03/04/26
26C0140-12	TS-01-S-E6	03/04/26
BC60159-BLK1	Blank	03/04/26
BC60159-BS1	LCS	03/04/26

Batch ID: BC60161 **Preparation Method:** % Solids Prep **Prepared By:** CAD

Sample ID	Client Sample ID	Preparation Date
26C0140-07	TS-01-S-E1	03/04/26
26C0140-08	TS-01-S-E2	03/04/26
26C0140-09	TS-01-S-E3	03/04/26
26C0140-10	TS-01-S-E4	03/04/26
26C0140-11	TS-01-S-E5	03/04/26
26C0140-12	TS-01-S-E6	03/04/26
BC60161-BLK1	Blank	03/04/26
BC60161-DUP1	Duplicate	03/04/26

Batch ID: BC60177 **Preparation Method:** EPA 5030B **Prepared By:** THD

Sample ID	Client Sample ID	Preparation Date
26C0140-01	TS-01-GW-E1	03/04/26
26C0140-02	TS-01-GW-E2	03/04/26
26C0140-03	TS-01-GW-E3	03/04/26
26C0140-04	TS-01-GW-E4	03/04/26
26C0140-05	TS-01-GW-E5	03/04/26
26C0140-06	TS-01-GW-E6	03/04/26
BC60177-BLK1	Blank	03/04/26
BC60177-BS1	LCS	03/04/26
BC60177-BSD1	LCS Dup	03/04/26

Batch ID: BC60190 **Preparation Method:** EPA 3510C **Prepared By:** MM

Sample ID	Client Sample ID	Preparation Date
26C0140-04	TS-01-GW-E4	03/04/26
26C0140-04RE1	TS-01-GW-E4	03/04/26
26C0140-05	TS-01-GW-E5	03/04/26
26C0140-05RE1	TS-01-GW-E5	03/04/26

26C0140-06	TS-01-GW-E6	03/04/26
26C0140-06RE1	TS-01-GW-E6	03/04/26
BC60190-BLK1	Blank	03/04/26
BC60190-BS1	LCS	03/04/26
BC60190-BSD1	LCS Dup	03/04/26

Batch ID: BC60193 **Preparation Method:** EPA 3510C **Prepared By:** MM

Sample ID	Client Sample ID	Preparation Date
26C0140-04	TS-01-GW-E4	03/04/26
26C0140-04RE1	TS-01-GW-E4	03/04/26
26C0140-05	TS-01-GW-E5	03/04/26
26C0140-05RE1	TS-01-GW-E5	03/04/26
26C0140-06	TS-01-GW-E6	03/04/26
26C0140-06RE1	TS-01-GW-E6	03/04/26

Batch ID: BC60269 **Preparation Method:** EPA 3510C **Prepared By:** AM2

Sample ID	Client Sample ID	Preparation Date
26C0140-01	TS-01-GW-E1	03/05/26
26C0140-02	TS-01-GW-E2	03/05/26
26C0140-03	TS-01-GW-E3	03/05/26
BC60269-BLK1	Blank	03/05/26
BC60269-BS1	LCS	03/05/26
BC60269-BSD1	LCS Dup	03/05/26

Batch ID: BC60270 **Preparation Method:** EPA 3510C **Prepared By:** AM2

Sample ID	Client Sample ID	Preparation Date
26C0140-01	TS-01-GW-E1	03/05/26
26C0140-01RE1	TS-01-GW-E1	03/05/26
26C0140-02	TS-01-GW-E2	03/05/26
26C0140-02RE1	TS-01-GW-E2	03/05/26
26C0140-02RE2	TS-01-GW-E2	03/05/26
26C0140-03	TS-01-GW-E3	03/05/26
26C0140-03RE1	TS-01-GW-E3	03/05/26
BC60270-BLK2	Blank	03/05/26
BC60270-BS2	LCS	03/05/26

Batch ID: BC60283 **Preparation Method:** Analysis Preparation **Prepared By:** SMM

Sample ID	Client Sample ID	Preparation Date
26C0140-01	TS-01-GW-E1	03/05/26
26C0140-02	TS-01-GW-E2	03/05/26
26C0140-03	TS-01-GW-E3	03/05/26
26C0140-04	TS-01-GW-E4	03/05/26
26C0140-05	TS-01-GW-E5	03/05/26
26C0140-06	TS-01-GW-E6	03/05/26

BC60283-BLK1	Blank	03/05/26
BC60283-BS1	LCS	03/05/26

Batch ID: BC60305 **Preparation Method:** EPA 5030B **Prepared By:** THD

Sample ID	Client Sample ID	Preparation Date
26C0140-01RE1	TS-01-GW-E1	03/05/26
26C0140-02RE1	TS-01-GW-E2	03/05/26
26C0140-03RE1	TS-01-GW-E3	03/05/26
26C0140-04RE1	TS-01-GW-E4	03/05/26
26C0140-05RE1	TS-01-GW-E5	03/05/26
26C0140-06RE1	TS-01-GW-E6	03/05/26
BC60305-BLK1	Blank	03/05/26
BC60305-BS1	LCS	03/05/26
BC60305-BSD1	LCS Dup	03/05/26

Batch ID: BC60444 **Preparation Method:** EPA 5035A **Prepared By:** PRS

Sample ID	Client Sample ID	Preparation Date
26C0140-07	TS-01-S-E1	03/09/26
26C0140-08	TS-01-S-E2	03/09/26
26C0140-09	TS-01-S-E3	03/09/26
26C0140-10	TS-01-S-E4	03/09/26
26C0140-11	TS-01-S-E5	03/09/26
BC60444-BLK1	Blank	03/09/26
BC60444-BS1	LCS	03/09/26
BC60444-BSD1	LCS Dup	03/09/26

Batch ID: BC60518 **Preparation Method:** EPA 5035A **Prepared By:** me

Sample ID	Client Sample ID	Preparation Date
26C0140-12	TS-01-S-E6	03/11/26
BC60518-BLK1	Blank	03/11/26
BC60518-BS1	LCS	03/11/26
BC60518-BSD1	LCS Dup	03/11/26

Batch ID: BC60560 **Preparation Method:** EPA 5035A **Prepared By:** PRS

Sample ID	Client Sample ID	Preparation Date
26C0140-07RE1	TS-01-S-E1	03/09/26
26C0140-08RE1	TS-01-S-E2	03/09/26
BC60560-BLK2	Blank	03/11/26
BC60560-BS2	LCS	03/11/26
BC60560-BSD2	LCS Dup	03/11/26

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BC60177 - EPA 5030B

Blank (BC60177-BLK1) Blank — Prepared & Analyzed: 03/04/2026

1,1,1,2-Tetrachloroethane	ND	0.500	ug/L
1,1,1-Trichloroethane	ND	0.500	"
1,1,2,2-Tetrachloroethane	ND	0.500	"
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.500	"
1,1,2-Trichloroethane	ND	0.500	"
1,1-Dichloroethane	ND	0.500	"
1,1-Dichloroethylene	ND	0.500	"
1,2,3-Trichlorobenzene	ND	0.500	"
1,2,3-Trichloropropane	ND	0.500	"
1,2,4-Trichlorobenzene	ND	0.500	"
1,2,4-Trimethylbenzene	ND	0.500	"
1,2-Dibromo-3-chloropropane	ND	0.500	"
1,2-Dibromoethane	ND	0.500	"
1,2-Dichlorobenzene	ND	0.500	"
1,2-Dichloroethane	ND	0.500	"
1,2-Dichloropropane	ND	0.500	"
1,3,5-Trimethylbenzene	ND	0.500	"
1,3-Dichlorobenzene	ND	0.500	"
1,4-Dichlorobenzene	ND	0.500	"
2-Butanone	ND	0.500	"
2-Hexanone	ND	0.500	"
4-Methyl-2-pentanone	ND	0.500	"
Acetone	ND	2.00	"
Acrolein	ND	0.500	"
Acrylonitrile	ND	0.500	"
Benzene	ND	0.500	"
Bromochloromethane	ND	0.500	"
Bromodichloromethane	ND	0.500	"
Bromoform	ND	0.500	"
Bromomethane	ND	2.00	"
Carbon disulfide	ND	0.500	"
Carbon tetrachloride	ND	0.500	"
Chlorobenzene	ND	0.500	"
Chloroethane	ND	0.500	"
Chloroform	ND	0.500	"
Chloromethane	ND	0.500	"
cis-1,2-Dichloroethylene	ND	0.500	"
cis-1,3-Dichloropropylene	ND	0.500	"
Cyclohexane	ND	0.500	"
Dibromochloromethane	ND	0.500	"
Dibromomethane	ND	0.500	"
Dichlorodifluoromethane	ND	0.500	"
Ethyl Benzene	ND	0.500	"
Hexachlorobutadiene	ND	0.500	"
Isopropylbenzene	ND	0.500	"
Methyl acetate	ND	0.500	"
Methyl tert-butyl ether (MTBE)	ND	0.500	"
Methylcyclohexane	ND	0.500	"
Methylene chloride	ND	2.00	"

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BC60177 - EPA 5030B											
Blank (BC60177-BLK1) Blank								Prepared & Analyzed: 03/04/2026			
n-Butylbenzene	ND	0.500	ug/L								
n-Propylbenzene	ND	0.500	"								
o-Xylene	ND	0.500	"								
p- & m- Xylenes	ND	1.00	"								
p-Isopropyltoluene	ND	0.500	"								
sec-Butylbenzene	ND	0.500	"								
Styrene	ND	0.500	"								
tert-Butyl alcohol (TBA)	ND	1.00	"								
tert-Butylbenzene	ND	0.500	"								
Tetrachloroethylene	ND	0.500	"								
Toluene	ND	0.500	"								
trans-1,2-Dichloroethylene	ND	0.500	"								
trans-1,3-Dichloropropylene	ND	0.500	"								
Trichloroethylene	ND	0.500	"								
Trichlorofluoromethane	ND	0.500	"								
Vinyl Chloride	ND	0.500	"								
Xylenes, Total	ND	1.50	"								
Surrogate: SURR: 1,2-Dichloroethane-d4	*11.1*		*"*	*10.0*		*111*	*69-130*				
Surrogate: SURR: Toluene-d8	*11.0*		*"*	*10.0*		*110*	*81-117*				
Surrogate: SURR: p-Bromofluorobenzene	*10.7*		*"*	*10.0*		*107*	*79-122*				
LCS (BC60177-BS1) LCS								Prepared & Analyzed: 03/04/2026			
1,1,1,2-Tetrachloroethane	10.2		ug/L	10.0		102	82-126				
1,1,1-Trichloroethane	10.2		"	10.0		102	78-136				
1,1,2,2-Tetrachloroethane	9.32		"	10.0		93.2	76-129				
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	12.2		"	10.0		122	54-165				
1,1,2-Trichloroethane	9.12		"	10.0		91.2	82-123				
1,1-Dichloroethane	10.2		"	10.0		102	82-129				
1,1-Dichloroethylene	11.8		"	10.0		118	68-138				
1,2,3-Trichlorobenzene	9.24		"	10.0		92.4	76-136				
1,2,3-Trichloropropane	9.08		"	10.0		90.8	77-128				
1,2,4-Trichlorobenzene	9.94		"	10.0		99.4	76-137				
1,2,4-Trimethylbenzene	12.1		"	10.0		121	82-132				
1,2-Dibromo-3-chloropropane	8.59		"	10.0		85.9	45-147				
1,2-Dibromoethane	9.24		"	10.0		92.4	83-124				
1,2-Dichlorobenzene	10.5		"	10.0		105	79-123				
1,2-Dichloroethane	8.85		"	10.0		88.5	73-132				
1,2-Dichloropropane	10.2		"	10.0		102	78-126				
1,3,5-Trimethylbenzene	12.3		"	10.0		123	80-131				
1,3-Dichlorobenzene	11.0		"	10.0		110	86-122				
1,4-Dichlorobenzene	10.8		"	10.0		108	85-124				
2-Butanone	47.2		"	10.0		472	49-152	High Bias			
2-Hexanone	33.5		"	10.0		335	51-146	High Bias			
4-Methyl-2-pentanone	35.8		"	10.0		358	57-145	High Bias			
Acetone	35.8		"	10.0		358	14-150	High Bias			
Acrolein	41.7		"	40.0		104	10-153				
Acrylonitrile	9.27		"	10.0		92.7	51-150				
Benzene	9.57		"	10.0		95.7	85-126				
Bromochloromethane	8.93		"	10.0		89.3	77-128				
Bromodichloromethane	9.90		"	10.0		99.0	79-128				

Volatile Organic Compounds by GC/MS - Quality Control Data

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Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BC60177 - EPA 5030B											
LCS (BC60177-BS1) LCS							Prepared & Analyzed: 03/04/2026				
Bromoform	8.50		ug/L	10.0		85.0	78-133				
Bromomethane	9.97		"	10.0		99.7	43-168				
Carbon disulfide	10.5		"	10.0		105	68-146				
Carbon tetrachloride	10.3		"	10.0		103	77-141				
Chlorobenzene	10.4		"	10.0		104	88-120				
Chloroethane	14.3		"	10.0		143	65-136	High Bias			
Chloroform	9.23		"	10.0		92.3	82-128				
Chloromethane	8.04		"	10.0		80.4	43-155				
cis-1,2-Dichloroethylene	9.73		"	10.0		97.3	83-129				
cis-1,3-Dichloropropylene	10.4		"	10.0		104	80-131				
Cyclohexane	10.2		"	10.0		102	63-149				
Dibromochloromethane	8.99		"	10.0		89.9	80-130				
Dibromomethane	9.65		"	10.0		96.5	72-134				
Dichlorodifluoromethane	6.52		"	10.0		65.2	44-144				
Ethyl Benzene	11.6		"	10.0		116	80-131				
Hexachlorobutadiene	12.6		"	10.0		126	67-146				
Isopropylbenzene	12.7		"	10.0		127	76-140				
Methyl acetate	8.87		"	10.0		88.7	51-139				
Methyl tert-butyl ether (MTBE)	8.62		"	10.0		86.2	76-135				
Methylcyclohexane	11.4		"	10.0		114	72-143				
Methylene chloride	8.21		"	10.0		82.1	55-137				
n-Butylbenzene	11.4		"	10.0		114	79-132				
n-Propylbenzene	12.9		"	10.0		129	78-133				
o-Xylene	11.4		"	10.0		114	78-130				
p- & m- Xylenes	22.9		"	20.0		114	77-133				
p-Isopropyltoluene	13.6		"	10.0		136	81-136				
sec-Butylbenzene	13.6		"	10.0		136	79-137				
Styrene	11.1		"	10.0		111	67-132				
tert-Butyl alcohol (TBA)	43.1		"	50.0		86.2	25-162				
tert-Butylbenzene	11.0		"	10.0		110	77-138				
Tetrachloroethylene	10.1		"	10.0		101	82-131				
Toluene	11.1		"	10.0		111	80-127				
trans-1,2-Dichloroethylene	12.0		"	10.0		120	80-132				
trans-1,3-Dichloropropylene	10.4		"	10.0		104	78-131				
Trichloroethylene	10.9		"	10.0		109	82-128				
Trichlorofluoromethane	11.8		"	10.0		118	67-139				
Vinyl Chloride	9.78		"	10.0		97.8	58-145				
Surrogate: SURR: 1,2-Dichloroethane-d4	*9.39*		*"*	*10.0*		*93.9*	*69-130*				
Surrogate: SURR: Toluene-d8	*11.1*		*"*	*10.0*		*111*	*81-117*				
Surrogate: SURR: p-Bromofluorobenzene	*10.9*		*"*	*10.0*		*109*	*79-122*				

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BC60177 - EPA 5030B											
LCS Dup (BC60177-BSD1) LCS Dup							Prepared & Analyzed: 03/04/2026				
1,1,1,2-Tetrachloroethane	9.86		ug/L	10.0		98.6	82-126		2.90	30	
1,1,1-Trichloroethane	9.72		"	10.0		97.2	78-136		4.62	30	
1,1,2,2-Tetrachloroethane	10.2		"	10.0		102	76-129		9.21	30	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	11.7		"	10.0		117	54-165		4.19	30	
1,1,2-Trichloroethane	9.64		"	10.0		96.4	82-123		5.54	30	
1,1-Dichloroethane	9.25		"	10.0		92.5	82-129		9.47	30	
1,1-Dichloroethylene	11.4		"	10.0		114	68-138		3.02	30	
1,2,3-Trichlorobenzene	9.54		"	10.0		95.4	76-136		3.19	30	
1,2,3-Trichloropropane	9.72		"	10.0		97.2	77-128		6.81	30	
1,2,4-Trichlorobenzene	9.69		"	10.0		96.9	76-137		2.55	30	
1,2,4-Trimethylbenzene	10.7		"	10.0		107	82-132		12.3	30	
1,2-Dibromo-3-chloropropane	10.0		"	10.0		100	45-147		15.4	30	
1,2-Dibromoethane	9.88		"	10.0		98.8	83-124		6.69	30	
1,2-Dichlorobenzene	10.0		"	10.0		100	79-123		4.97	30	
1,2-Dichloroethane	9.57		"	10.0		95.7	73-132		7.82	30	
1,2-Dichloropropane	9.67		"	10.0		96.7	78-126		5.14	30	
1,3,5-Trimethylbenzene	10.8		"	10.0		108	80-131		12.9	30	
1,3-Dichlorobenzene	10.1		"	10.0		101	86-122		8.59	30	
1,4-Dichlorobenzene	10.2		"	10.0		102	85-124		5.99	30	
2-Butanone	48.0		"	10.0		480	49-152	High Bias	1.77	30	
2-Hexanone	42.3		"	10.0		423	51-146	High Bias	23.2	30	
4-Methyl-2-pentanone	44.5		"	10.0		445	57-145	High Bias	21.6	30	
Acetone	41.1		"	10.0		411	14-150	High Bias	13.8	30	
Acrolein	48.4		"	40.0		121	10-153		14.7	30	
Acrylonitrile	9.75		"	10.0		97.5	51-150		5.05	30	
Benzene	9.29		"	10.0		92.9	85-126		2.97	30	
Bromochloromethane	9.30		"	10.0		93.0	77-128		4.06	30	
Bromodichloromethane	9.68		"	10.0		96.8	79-128		2.25	30	
Bromoform	9.08		"	10.0		90.8	78-133		6.60	30	
Bromomethane	10.0		"	10.0		100	43-168		0.300	30	
Carbon disulfide	10.1		"	10.0		101	68-146		3.97	30	
Carbon tetrachloride	9.65		"	10.0		96.5	77-141		6.52	30	
Chlorobenzene	9.84		"	10.0		98.4	88-120		5.24	30	
Chloroethane	14.0		"	10.0		140	65-136	High Bias	2.12	30	
Chloroform	9.07		"	10.0		90.7	82-128		1.75	30	
Chloromethane	7.68		"	10.0		76.8	43-155		4.58	30	
cis-1,2-Dichloroethylene	9.39		"	10.0		93.9	83-129		3.56	30	
cis-1,3-Dichloropropylene	9.97		"	10.0		99.7	80-131		3.93	30	
Cyclohexane	9.46		"	10.0		94.6	63-149		7.72	30	
Dibromochloromethane	9.36		"	10.0		93.6	80-130		4.03	30	
Dibromomethane	9.91		"	10.0		99.1	72-134		2.66	30	
Dichlorodifluoromethane	6.01		"	10.0		60.1	44-144		8.14	30	
Ethyl Benzene	10.6		"	10.0		106	80-131		8.66	30	
Hexachlorobutadiene	10.8		"	10.0		108	67-146		15.3	30	
Isopropylbenzene	11.0		"	10.0		110	76-140		14.1	30	
Methyl acetate	9.88		"	10.0		98.8	51-139		10.8	30	
Methyl tert-butyl ether (MTBE)	10.0		"	10.0		100	76-135		15.1	30	
Methylcyclohexane	9.96		"	10.0		99.6	72-143		13.8	30	
Methylene chloride	8.18		"	10.0		81.8	55-137		0.366	30	
n-Butylbenzene	9.76		"	10.0		97.6	79-132		15.7	30	

Volatile Organic Compounds by GC/MS - Quality Control Data

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Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BC60177 - EPA 5030B											
LCS Dup (BC60177-BSD1) LCS Dup								Prepared & Analyzed: 03/04/2026			
n-Propylbenzene	11.1		ug/L	10.0		111	78-133		14.7	30	
o-Xylene	10.7		"	10.0		107	78-130		6.17	30	
p- & m- Xylenes	21.1		"	20.0		105	77-133		8.28	30	
p-Isopropyltoluene	11.7		"	10.0		117	81-136		14.8	30	
sec-Butylbenzene	11.5		"	10.0		115	79-137		16.2	30	
Styrene	10.6		"	10.0		106	67-132		4.70	30	
tert-Butyl alcohol (TBA)	44.0		"	50.0		87.9	25-162		1.95	30	
tert-Butylbenzene	9.54		"	10.0		95.4	77-138		14.7	30	
Tetrachloroethylene	9.04		"	10.0		90.4	82-131		11.3	30	
Toluene	10.1		"	10.0		101	80-127		9.55	30	
trans-1,2-Dichloroethylene	11.0		"	10.0		110	80-132		8.17	30	
trans-1,3-Dichloropropylene	9.97		"	10.0		99.7	78-131		3.93	30	
Trichloroethylene	9.81		"	10.0		98.1	82-128		10.5	30	
Trichlorofluoromethane	11.4		"	10.0		114	67-139		3.11	30	
Vinyl Chloride	9.23		"	10.0		92.3	58-145		5.79	30	
Surrogate: SURR: 1,2-Dichloroethane-d4	*10.5*		*"*	*10.0*		*105*	*69-130*				
Surrogate: SURR: Toluene-d8	*10.5*		*"*	*10.0*		*105*	*81-117*				
Surrogate: SURR: p-Bromofluorobenzene	*10.6*		*"*	*10.0*		*106*	*79-122*				
Batch BC60305 - EPA 5030B											
Blank (BC60305-BLK1) Blank								Prepared & Analyzed: 03/05/2026			
1,1,1,2-Tetrachloroethane	ND	0.500	ug/L								
1,1,1-Trichloroethane	ND	0.500	"								
1,1,2,2-Tetrachloroethane	ND	0.500	"								
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.500	"								
1,1,2-Trichloroethane	ND	0.500	"								
1,1-Dichloroethane	ND	0.500	"								
1,1-Dichloroethylene	ND	0.500	"								
1,2,3-Trichlorobenzene	0.370	0.500	"								
1,2,3-Trichloropropane	ND	0.500	"								
1,2,4-Trichlorobenzene	0.370	0.500	"								
1,2,4-Trimethylbenzene	ND	0.500	"								
1,2-Dibromo-3-chloropropane	ND	0.500	"								
1,2-Dibromoethane	ND	0.500	"								
1,2-Dichlorobenzene	ND	0.500	"								
1,2-Dichloroethane	ND	0.500	"								
1,2-Dichloropropane	ND	0.500	"								
1,3,5-Trimethylbenzene	ND	0.500	"								
1,3-Dichlorobenzene	ND	0.500	"								
1,4-Dichlorobenzene	ND	0.500	"								
2-Butanone	ND	0.500	"								
2-Hexanone	ND	0.500	"								
4-Methyl-2-pentanone	ND	0.500	"								
Acetone	ND	2.00	"								
Acrolein	ND	0.500	"								
Acrylonitrile	ND	0.500	"								
Benzene	ND	0.500	"								
Bromochloromethane	ND	0.500	"								
Bromodichloromethane	ND	0.500	"								
Bromoform	ND	0.500	"								

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Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BC60305 - EPA 5030B											
Blank (BC60305-BLK1) Blank								Prepared & Analyzed: 03/05/2026			
Bromomethane	ND	2.00	ug/L								
Carbon disulfide	ND	0.500	"								
Carbon tetrachloride	ND	0.500	"								
Chlorobenzene	ND	0.500	"								
Chloroethane	ND	0.500	"								
Chloroform	ND	0.500	"								
Chloromethane	ND	0.500	"								
cis-1,2-Dichloroethylene	ND	0.500	"								
cis-1,3-Dichloropropylene	ND	0.500	"								
Cyclohexane	ND	0.500	"								
Dibromochloromethane	ND	0.500	"								
Dibromomethane	ND	0.500	"								
Dichlorodifluoromethane	ND	0.500	"								
Ethyl Benzene	ND	0.500	"								
Hexachlorobutadiene	ND	0.500	"								
Isopropylbenzene	ND	0.500	"								
Methyl acetate	ND	0.500	"								
Methyl tert-butyl ether (MTBE)	ND	0.500	"								
Methylcyclohexane	ND	0.500	"								
Methylene chloride	2.11	2.00	"								
n-Butylbenzene	ND	0.500	"								
n-Propylbenzene	ND	0.500	"								
o-Xylene	ND	0.500	"								
p- & m- Xylenes	ND	1.00	"								
p-Isopropyltoluene	ND	0.500	"								
sec-Butylbenzene	ND	0.500	"								
Styrene	ND	0.500	"								
tert-Butyl alcohol (TBA)	ND	1.00	"								
tert-Butylbenzene	ND	0.500	"								
Tetrachloroethylene	ND	0.500	"								
Toluene	ND	0.500	"								
trans-1,2-Dichloroethylene	ND	0.500	"								
trans-1,3-Dichloropropylene	ND	0.500	"								
Trichloroethylene	ND	0.500	"								
Trichlorofluoromethane	ND	0.500	"								
Vinyl Chloride	ND	0.500	"								
Xylenes, Total	ND	1.50	"								
Surrogate: SURR: 1,2-Dichloroethane-d4	*10.0*		*"*	*10.0*		*100*	*69-130*				
Surrogate: SURR: Toluene-d8	*10.4*		*"*	*10.0*		*104*	*81-117*				
Surrogate: SURR: p-Bromofluorobenzene	*11.1*		*"*	*10.0*		*111*	*79-122*				

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BC60305 - EPA 5030B											
LCS (BC60305-BS1) LCS							Prepared & Analyzed: 03/05/2026				
1,1,1,2-Tetrachloroethane	10.1		ug/L	10.0		101	82-126				
1,1,1-Trichloroethane	11.4		"	10.0		114	78-136				
1,1,2,2-Tetrachloroethane	11.4		"	10.0		114	76-129				
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	11.1		"	10.0		111	54-165				
1,1,2-Trichloroethane	10.9		"	10.0		109	82-123				
1,1-Dichloroethane	12.6		"	10.0		126	82-129				
1,1-Dichloroethylene	11.5		"	10.0		115	68-138				
1,2,3-Trichlorobenzene	9.21		"	10.0		92.1	76-136				
1,2,3-Trichloropropane	10.4		"	10.0		104	77-128				
1,2,4-Trichlorobenzene	9.21		"	10.0		92.1	76-137				
1,2,4-Trimethylbenzene	10.9		"	10.0		109	82-132				
1,2-Dibromo-3-chloropropane	8.36		"	10.0		83.6	45-147				
1,2-Dibromoethane	11.0		"	10.0		110	83-124				
1,2-Dichlorobenzene	10.1		"	10.0		101	79-123				
1,2-Dichloroethane	10.8		"	10.0		108	73-132				
1,2-Dichloropropane	12.3		"	10.0		123	78-126				
1,3,5-Trimethylbenzene	10.9		"	10.0		109	80-131				
1,3-Dichlorobenzene	10.0		"	10.0		100	86-122				
1,4-Dichlorobenzene	10.0		"	10.0		100	85-124				
2-Butanone	10.9		"	10.0		109	49-152				
2-Hexanone	11.0		"	10.0		110	51-146				
4-Methyl-2-pentanone	10.9		"	10.0		109	57-145				
Acetone	12.0		"	10.0		120	14-150				
Acrolein	50.0		"	40.0		125	10-153				
Acrylonitrile	11.0		"	10.0		110	51-150				
Benzene	11.8		"	10.0		118	85-126				
Bromochloromethane	12.9		"	10.0		129	77-128	High Bias			
Bromodichloromethane	11.1		"	10.0		111	79-128				
Bromoform	8.35		"	10.0		83.5	78-133				
Bromomethane	7.50		"	10.0		75.0	43-168				
Carbon disulfide	10.1		"	10.0		101	68-146				
Carbon tetrachloride	11.6		"	10.0		116	77-141				
Chlorobenzene	10.5		"	10.0		105	88-120				
Chloroethane	15.1		"	10.0		151	65-136	High Bias			
Chloroform	11.1		"	10.0		111	82-128				
Chloromethane	8.73		"	10.0		87.3	43-155				
cis-1,2-Dichloroethylene	11.5		"	10.0		115	83-129				
cis-1,3-Dichloropropylene	11.2		"	10.0		112	80-131				
Cyclohexane	13.1		"	10.0		131	63-149				
Dibromochloromethane	9.50		"	10.0		95.0	80-130				
Dibromomethane	11.0		"	10.0		110	72-134				
Dichlorodifluoromethane	7.24		"	10.0		72.4	44-144				
Ethyl Benzene	11.5		"	10.0		115	80-131				
Hexachlorobutadiene	8.07		"	10.0		80.7	67-146				
Isopropylbenzene	11.2		"	10.0		112	76-140				
Methyl acetate	12.0		"	10.0		120	51-139				
Methyl tert-butyl ether (MTBE)	12.4		"	10.0		124	76-135				
Methylcyclohexane	12.4		"	10.0		124	72-143				
Methylene chloride	13.6		"	10.0		136	55-137				
n-Butylbenzene	9.16		"	10.0		91.6	79-132				

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BC60305 - EPA 5030B											
LCS (BC60305-BS1) LCS							Prepared & Analyzed: 03/05/2026				
n-Propylbenzene	11.5		ug/L	10.0		115	78-133				
o-Xylene	11.3		"	10.0		113	78-130				
p- & m- Xylenes	22.8		"	20.0		114	77-133				
p-Isopropyltoluene	10.8		"	10.0		108	81-136				
sec-Butylbenzene	10.8		"	10.0		108	79-137				
Styrene	10.9		"	10.0		109	67-132				
tert-Butyl alcohol (TBA)	40.9		"	50.0		81.9	25-162				
tert-Butylbenzene	9.50		"	10.0		95.0	77-138				
Tetrachloroethylene	8.34		"	10.0		83.4	82-131				
Toluene	11.5		"	10.0		115	80-127				
trans-1,2-Dichloroethylene	12.0		"	10.0		120	80-132				
trans-1,3-Dichloropropylene	8.58		"	10.0		85.8	78-131				
Trichloroethylene	11.0		"	10.0		110	82-128				
Trichlorofluoromethane	10.7		"	10.0		107	67-139				
Vinyl Chloride	10.8		"	10.0		108	58-145				
Surrogate: SURR: 1,2-Dichloroethane-d4	*9.46*		*"*	*10.0*		*94.6*	*69-130*				
Surrogate: SURR: Toluene-d8	*10.4*		*"*	*10.0*		*104*	*81-117*				
Surrogate: SURR: p-Bromofluorobenzene	*10.9*		*"*	*10.0*		*109*	*79-122*				
LCS Dup (BC60305-BSD1) LCS Dup							Prepared & Analyzed: 03/05/2026				
1,1,1,2-Tetrachloroethane	9.37		ug/L	10.0		93.7	82-126		7.10	30	
1,1,1-Trichloroethane	10.4		"	10.0		104	78-136		9.73	30	
1,1,2,2-Tetrachloroethane	10.4		"	10.0		104	76-129		8.82	30	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	9.55		"	10.0		95.5	54-165		15.4	30	
1,1,2-Trichloroethane	10.0		"	10.0		100	82-123		8.25	30	
1,1-Dichloroethane	11.3		"	10.0		113	82-129		10.9	30	
1,1-Dichloroethylene	10.3		"	10.0		103	68-138		11.5	30	
1,2,3-Trichlorobenzene	8.96		"	10.0		89.6	76-136		2.75	30	
1,2,3-Trichloropropane	9.79		"	10.0		97.9	77-128		6.52	30	
1,2,4-Trichlorobenzene	8.96		"	10.0		89.6	76-137		2.75	30	
1,2,4-Trimethylbenzene	9.92		"	10.0		99.2	82-132		9.23	30	
1,2-Dibromo-3-chloropropane	7.57		"	10.0		75.7	45-147		9.92	30	
1,2-Dibromoethane	10.1		"	10.0		101	83-124		8.37	30	
1,2-Dichlorobenzene	9.18		"	10.0		91.8	79-123		9.15	30	
1,2-Dichloroethane	10.0		"	10.0		100	73-132		7.38	30	
1,2-Dichloropropane	11.4		"	10.0		114	78-126		7.52	30	
1,3,5-Trimethylbenzene	9.91		"	10.0		99.1	80-131		9.24	30	
1,3-Dichlorobenzene	9.26		"	10.0		92.6	86-122		8.18	30	
1,4-Dichlorobenzene	9.22		"	10.0		92.2	85-124		8.22	30	
2-Butanone	10.4		"	10.0		104	49-152		5.18	30	
2-Hexanone	9.87		"	10.0		98.7	51-146		11.0	30	
4-Methyl-2-pentanone	10.4		"	10.0		104	57-145		4.69	30	
Acetone	11.6		"	10.0		116	14-150		3.23	30	
Acrolein	45.4		"	40.0		114	10-153		9.58	30	
Acrylonitrile	10.4		"	10.0		104	51-150		5.51	30	
Benzene	10.6		"	10.0		106	85-126		11.4	30	
Bromochloromethane	11.7		"	10.0		117	77-128		10.2	30	
Bromodichloromethane	10.3		"	10.0		103	79-128		7.10	30	
Bromoform	7.40		"	10.0		74.0	78-133	Low Bias	12.1	30	
Bromomethane	6.96		"	10.0		69.6	43-168		7.47	30	

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BC60305 - EPA 5030B											
LCS Dup (BC60305-BSD1) LCS Dup							Prepared & Analyzed: 03/05/2026				
Carbon disulfide	8.89		ug/L	10.0		88.9	68-146		12.6	30	
Carbon tetrachloride	10.1		"	10.0		101	77-141		13.8	30	
Chlorobenzene	9.63		"	10.0		96.3	88-120		8.45	30	
Chloroethane	13.3		"	10.0		133	65-136		12.7	30	
Chloroform	10.6		"	10.0		106	82-128		4.33	30	
Chloromethane	7.84		"	10.0		78.4	43-155		10.7	30	
cis-1,2-Dichloroethylene	10.4		"	10.0		104	83-129		9.74	30	
cis-1,3-Dichloropropylene	10.6		"	10.0		106	80-131		5.77	30	
Cyclohexane	11.4		"	10.0		114	63-149		14.1	30	
Dibromochloromethane	8.99		"	10.0		89.9	80-130		5.52	30	
Dibromomethane	10.5		"	10.0		105	72-134		5.30	30	
Dichlorodifluoromethane	6.11		"	10.0		61.1	44-144		16.9	30	
Ethyl Benzene	10.5		"	10.0		105	80-131		9.07	30	
Hexachlorobutadiene	7.90		"	10.0		79.0	67-146		2.13	30	
Isopropylbenzene	10.2		"	10.0		102	76-140		9.43	30	
Methyl acetate	11.2		"	10.0		112	51-139		6.12	30	
Methyl tert-butyl ether (MTBE)	11.7		"	10.0		117	76-135		5.99	30	
Methylcyclohexane	10.8		"	10.0		108	72-143		14.2	30	
Methylene chloride	12.6		"	10.0		126	55-137		7.33	30	
n-Butylbenzene	8.18		"	10.0		81.8	79-132		11.3	30	
n-Propylbenzene	10.4		"	10.0		104	78-133		9.89	30	
o-Xylene	10.3		"	10.0		103	78-130		9.20	30	
p- & m- Xylenes	20.5		"	20.0		103	77-133		10.6	30	
p-Isopropyltoluene	9.85		"	10.0		98.5	81-136		8.74	30	
sec-Butylbenzene	9.84		"	10.0		98.4	79-137		9.76	30	
Styrene	10.1		"	10.0		101	67-132		7.79	30	
tert-Butyl alcohol (TBA)	38.2		"	50.0		76.4	25-162		6.98	30	
tert-Butylbenzene	8.64		"	10.0		86.4	77-138		9.48	30	
Tetrachloroethylene	7.50		"	10.0		75.0	82-131	Low Bias	10.6	30	
Toluene	10.6		"	10.0		106	80-127		8.41	30	
trans-1,2-Dichloroethylene	10.8		"	10.0		108	80-132		10.8	30	
trans-1,3-Dichloropropylene	7.84		"	10.0		78.4	78-131		9.01	30	
Trichloroethylene	10.1		"	10.0		101	82-128		8.88	30	
Trichlorofluoromethane	9.38		"	10.0		93.8	67-139		13.1	30	
Vinyl Chloride	9.54		"	10.0		95.4	58-145		12.8	30	
Surrogate: SURR: 1,2-Dichloroethane-d4	*9.31*		*"*	*10.0*		*93.1*	*69-130*				
Surrogate: SURR: Toluene-d8	*10.4*		*"*	*10.0*		*104*	*81-117*				
Surrogate: SURR: p-Bromofluorobenzene	*11.0*		*"*	*10.0*		*110*	*79-122*				

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BC60444 - EPA 5035A

Blank (BC60444-BLK1) Blank — Prepared: 03/09/2026 Analyzed: 03/10/2026

1,1,1,2-Tetrachloroethane	ND	0.0050	mg/kg wet
1,1,1-Trichloroethane	ND	0.0050	"
1,1,2,2-Tetrachloroethane	ND	0.0050	"
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.0050	"
1,1,2-Trichloroethane	ND	0.0050	"
1,1-Dichloroethane	ND	0.0050	"
1,1-Dichloroethylene	ND	0.0050	"
1,2,3-Trichlorobenzene	ND	0.0050	"
1,2,3-Trichloropropane	ND	0.0050	"
1,2,4-Trichlorobenzene	ND	0.0050	"
1,2,4-Trimethylbenzene	ND	0.0050	"
1,2-Dibromo-3-chloropropane	ND	0.0050	"
1,2-Dibromoethane	ND	0.0050	"
1,2-Dichlorobenzene	ND	0.0050	"
1,2-Dichloroethane	ND	0.0050	"
1,2-Dichloropropane	ND	0.0050	"
1,3,5-Trimethylbenzene	ND	0.0050	"
1,3-Dichlorobenzene	ND	0.0050	"
1,4-Dichlorobenzene	ND	0.0050	"
2-Butanone	ND	0.0050	"
2-Hexanone	ND	0.0050	"
4-Methyl-2-pentanone	ND	0.0050	"
Acetone	ND	0.010	"
Acrolein	ND	0.010	"
Acrylonitrile	ND	0.0050	"
Benzene	ND	0.0050	"
Bromochloromethane	ND	0.0050	"
Bromodichloromethane	ND	0.0050	"
Bromoform	ND	0.0050	"
Bromomethane	ND	0.0050	"
Carbon disulfide	ND	0.0050	"
Carbon tetrachloride	ND	0.0050	"
Chlorobenzene	ND	0.0050	"
Chloroethane	ND	0.0050	"
Chloroform	ND	0.0050	"
Chloromethane	ND	0.0050	"
cis-1,2-Dichloroethylene	ND	0.0050	"
cis-1,3-Dichloropropylene	ND	0.0050	"
Cyclohexane	ND	0.0050	"
Dibromochloromethane	ND	0.0050	"
Dibromomethane	ND	0.0050	"
Dichlorodifluoromethane	ND	0.0050	"
Ethyl Benzene	ND	0.0050	"
Hexachlorobutadiene	ND	0.0050	"
Isopropylbenzene	ND	0.0050	"
Methyl acetate	ND	0.0050	"
Methyl tert-butyl ether (MTBE)	ND	0.0050	"
Methylcyclohexane	ND	0.0050	"
Methylene chloride	ND	0.010	"
n-Butylbenzene	ND	0.0050	"

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BC60444 - EPA 5035A											
Blank (BC60444-BLK1) Blank									Prepared: 03/09/2026 Analyzed: 03/10/2026		
n-Propylbenzene	ND	0.0050	mg/kg wet								
o-Xylene	ND	0.0050	"								
p- & m- Xylenes	ND	0.010	"								
p-Isopropyltoluene	ND	0.0050	"								
sec-Butylbenzene	ND	0.0050	"								
Styrene	ND	0.0050	"								
tert-Butyl alcohol (TBA)	ND	0.025	"								
tert-Butylbenzene	ND	0.0050	"								
Tetrachloroethylene	ND	0.0050	"								
Toluene	ND	0.0050	"								
trans-1,2-Dichloroethylene	ND	0.0050	"								
trans-1,3-Dichloropropylene	ND	0.0050	"								
Trichloroethylene	ND	0.0050	"								
Trichlorofluoromethane	ND	0.0050	"								
Vinyl Chloride	ND	0.0050	"								
Xylenes, Total	ND	0.015	"								
Surrogate: SURR: 1,2-Dichloroethane-d4	*53.7*		*ug/L*	*50.0*		*107*	*77-125*				
Surrogate: SURR: Toluene-d8	*47.7*		*"*	*50.0*		*95.5*	*85-120*				
Surrogate: SURR: p-Bromofluorobenzene	*44.5*		*"*	*50.0*		*89.0*	*76-130*				
LCS (BC60444-BS1) LCS									Prepared: 03/09/2026 Analyzed: 03/10/2026		
1,1,1,2-Tetrachloroethane	50.7		ug/L	50.0		101	75-129				
1,1,1-Trichloroethane	56.8		"	50.0		114	71-137				
1,1,2,2-Tetrachloroethane	37.6		"	50.0		75.1	79-129	Low Bias			
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	35.0		"	50.0		69.9	58-146				
1,1,2-Trichloroethane	44.4		"	50.0		88.7	83-123				
1,1-Dichloroethane	47.4		"	50.0		94.8	75-130				
1,1-Dichloroethylene	39.8		"	50.0		79.7	64-137				
1,2,3-Trichlorobenzene	56.1		"	50.0		112	81-140				
1,2,3-Trichloropropane	43.9		"	50.0		87.8	81-126				
1,2,4-Trichlorobenzene	58.2		"	50.0		116	80-141				
1,2,4-Trimethylbenzene	42.9		"	50.0		85.8	84-125				
1,2-Dibromo-3-chloropropane	37.0		"	50.0		74.0	74-142				
1,2-Dibromoethane	48.2		"	50.0		96.5	86-123				
1,2-Dichlorobenzene	44.3		"	50.0		88.6	85-122				
1,2-Dichloroethane	48.3		"	50.0		96.6	71-133				
1,2-Dichloropropane	37.8		"	50.0		75.6	81-122	Low Bias			
1,3,5-Trimethylbenzene	43.9		"	50.0		87.8	82-126				
1,3-Dichlorobenzene	48.6		"	50.0		97.1	84-124				
1,4-Dichlorobenzene	50.0		"	50.0		100	84-124				
2-Butanone	45.4		"	50.0		90.7	58-147				
2-Hexanone	36.1		"	50.0		72.2	70-139				
4-Methyl-2-pentanone	35.8		"	50.0		71.6	72-132	Low Bias			
Acetone	42.7		"	50.0		85.5	36-155				
Acrolein	214		"	200		107	10-238				
Acrylonitrile	43.5		"	50.0		87.1	66-141				
Benzene	46.7		"	50.0		93.4	77-127				
Bromochloromethane	41.8		"	50.0		83.5	74-129				
Bromodichloromethane	45.6		"	50.0		91.2	81-124				
Bromoform	53.3		"	50.0		107	80-136				

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BC60444 - EPA 5035A											
LCS (BC60444-BS1) LCS									Prepared: 03/09/2026 Analyzed: 03/10/2026		
Bromomethane	39.4		ug/L	50.0		78.9	32-177				
Carbon disulfide	39.5		"	50.0		78.9	10-136				
Carbon tetrachloride	59.5		"	50.0		119	66-143				
Chlorobenzene	46.9		"	50.0		93.7	86-120				
Chloroethane	47.6		"	50.0		95.1	51-142				
Chloroform	50.8		"	50.0		102	76-131				
Chloromethane	32.3		"	50.0		64.5	49-132				
cis-1,2-Dichloroethylene	47.4		"	50.0		94.7	74-132				
cis-1,3-Dichloropropylene	43.1		"	50.0		86.1	81-129				
Cyclohexane	41.1		"	50.0		82.1	70-130				
Dibromochloromethane	50.1		"	50.0		100	10-200				
Dibromomethane	44.7		"	50.0		89.4	83-124				
Dichlorodifluoromethane	49.7		"	50.0		99.3	28-158				
Ethyl Benzene	43.8		"	50.0		87.6	84-125				
Hexachlorobutadiene	54.8		"	50.0		110	83-133				
Isopropylbenzene	45.0		"	50.0		89.9	81-127				
Methyl acetate	38.9		"	50.0		77.7	41-143				
Methyl tert-butyl ether (MTBE)	46.7		"	50.0		93.4	74-131				
Methylcyclohexane	40.4		"	50.0		80.7	70-130				
Methylene chloride	41.9		"	50.0		83.8	57-141				
n-Butylbenzene	40.7		"	50.0		81.4	80-130				
n-Propylbenzene	42.9		"	50.0		85.9	74-136				
o-Xylene	44.9		"	50.0		89.8	83-123				
p- & m- Xylenes	88.2		"	100		88.2	82-128				
p-Isopropyltoluene	42.8		"	50.0		85.5	85-125				
sec-Butylbenzene	43.9		"	50.0		87.8	83-125				
Styrene	46.6		"	50.0		93.1	86-126				
tert-Butyl alcohol (TBA)	250		"	250		99.9	70-130				
tert-Butylbenzene	45.9		"	50.0		91.9	80-127				
Tetrachloroethylene	54.1		"	50.0		108	80-129				
Toluene	43.9		"	50.0		87.8	85-121				
trans-1,2-Dichloroethylene	47.4		"	50.0		94.8	72-132				
trans-1,3-Dichloropropylene	44.5		"	50.0		88.9	78-132				
Trichloroethylene	44.0		"	50.0		88.0	84-123				
Trichlorofluoromethane	36.7		"	50.0		73.3	62-140				
Vinyl Chloride	35.1		"	50.0		70.2	52-130				
Surrogate: SURR: 1,2-Dichloroethane-d4	*53.6*		*"*	*50.0*		*107*	*77-125*				
Surrogate: SURR: Toluene-d8	*47.9*		*"*	*50.0*		*95.8*	*85-120*				
Surrogate: SURR: p-Bromofluorobenzene	*45.0*		*"*	*50.0*		*89.9*	*76-130*				

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BC60444 - EPA 5035A											
LCS Dup (BC60444-BSD1) LCS Dup									Prepared: 03/09/2026 Analyzed: 03/10/2026		
1,1,1,2-Tetrachloroethane	52.9		ug/L	50.0		106	75-129		4.19	30	
1,1,1-Trichloroethane	59.0		"	50.0		118	71-137		3.85	30	
1,1,2,2-Tetrachloroethane	39.2		"	50.0		78.3	79-129	Low Bias	4.17	30	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	36.2		"	50.0		72.4	58-146		3.46	30	
1,1,2-Trichloroethane	46.8		"	50.0		93.7	83-123		5.44	30	
1,1-Dichloroethane	49.3		"	50.0		98.7	75-130		3.97	30	
1,1-Dichloroethylene	41.0		"	50.0		81.9	64-137		2.80	30	
1,2,3-Trichlorobenzene	57.7		"	50.0		115	81-140		2.93	30	
1,2,3-Trichloropropane	45.2		"	50.0		90.5	81-126		3.07	30	
1,2,4-Trichlorobenzene	58.9		"	50.0		118	80-141		1.30	30	
1,2,4-Trimethylbenzene	43.3		"	50.0		86.7	84-125		1.04	30	
1,2-Dibromo-3-chloropropane	39.4		"	50.0		78.8	74-142		6.31	30	
1,2-Dibromoethane	50.2		"	50.0		100	86-123		3.86	30	
1,2-Dichlorobenzene	46.2		"	50.0		92.4	85-122		4.15	30	
1,2-Dichloroethane	51.0		"	50.0		102	71-133		5.38	30	
1,2-Dichloropropane	38.6		"	50.0		77.2	81-122	Low Bias	2.07	30	
1,3,5-Trimethylbenzene	43.8		"	50.0		87.7	82-126		0.137	30	
1,3-Dichlorobenzene	50.0		"	50.0		100	84-124		2.94	30	
1,4-Dichlorobenzene	51.3		"	50.0		103	84-124		2.49	30	
2-Butanone	47.8		"	50.0		95.5	58-147		5.18	30	
2-Hexanone	37.9		"	50.0		75.7	70-139		4.70	30	
4-Methyl-2-pentanone	37.4		"	50.0		74.7	72-132		4.24	30	
Acetone	44.9		"	50.0		89.9	36-155		5.04	30	
Acrolein	221		"	200		111	10-238		3.45	30	
Acrylonitrile	45.5		"	50.0		91.1	66-141		4.49	30	
Benzene	48.7		"	50.0		97.4	77-127		4.15	30	
Bromochloromethane	44.3		"	50.0		88.7	74-129		5.99	30	
Bromodichloromethane	47.3		"	50.0		94.6	81-124		3.59	30	
Bromoform	56.6		"	50.0		113	80-136		5.97	30	
Bromomethane	41.5		"	50.0		83.0	32-177		5.11	30	
Carbon disulfide	41.1		"	50.0		82.3	10-136		4.14	30	
Carbon tetrachloride	62.0		"	50.0		124	66-143		4.17	30	
Chlorobenzene	48.5		"	50.0		97.0	86-120		3.40	30	
Chloroethane	49.5		"	50.0		98.9	51-142		3.92	30	
Chloroform	53.5		"	50.0		107	76-131		5.27	30	
Chloromethane	33.2		"	50.0		66.3	49-132		2.78	30	
cis-1,2-Dichloroethylene	49.6		"	50.0		99.2	74-132		4.62	30	
cis-1,3-Dichloropropylene	44.6		"	50.0		89.1	81-129		3.42	30	
Cyclohexane	41.8		"	50.0		83.5	70-130		1.67	30	
Dibromochloromethane	52.7		"	50.0		105	10-200		5.08	30	
Dibromomethane	46.3		"	50.0		92.6	83-124		3.60	30	
Dichlorodifluoromethane	51.3		"	50.0		103	28-158		3.17	30	
Ethyl Benzene	44.8		"	50.0		89.6	84-125		2.28	30	
Hexachlorobutadiene	53.0		"	50.0		106	83-133		3.43	30	
Isopropylbenzene	45.4		"	50.0		90.8	81-127		0.996	30	
Methyl acetate	40.2		"	50.0		80.4	41-143		3.39	30	
Methyl tert-butyl ether (MTBE)	49.7		"	50.0		99.4	74-131		6.22	30	
Methylcyclohexane	39.9		"	50.0		79.9	70-130		1.07	30	
Methylene chloride	43.2		"	50.0		86.3	57-141		2.96	30	
n-Butylbenzene	39.5		"	50.0		79.0	80-130	Low Bias	2.99	30	

Volatile Organic Compounds by GC/MS - Quality Control Data

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Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BC60444 - EPA 5035A											
LCS Dup (BC60444-BSD1) LCS Dup									Prepared: 03/09/2026 Analyzed: 03/10/2026		
n-Propylbenzene	42.9		ug/L	50.0		85.8	74-136		0.0932	30	
o-Xylene	45.7		"	50.0		91.4	83-123		1.85	30	
p- & m- Xylenes	90.1		"	100		90.1	82-128		2.22	30	
p-Isopropyltoluene	41.8		"	50.0		83.7	85-125	Low Bias	2.22	30	
sec-Butylbenzene	43.2		"	50.0		86.5	83-125		1.51	30	
Styrene	47.9		"	50.0		95.8	86-126		2.88	30	
tert-Butyl alcohol (TBA)	257		"	250		103	70-130		3.05	30	
tert-Butylbenzene	45.3		"	50.0		90.7	80-127		1.29	30	
Tetrachloroethylene	55.5		"	50.0		111	80-129		2.56	30	
Toluene	44.8		"	50.0		89.7	85-121		2.12	30	
trans-1,2-Dichloroethylene	49.0		"	50.0		98.0	72-132		3.32	30	
trans-1,3-Dichloropropylene	46.2		"	50.0		92.4	78-132		3.79	30	
Trichloroethylene	45.2		"	50.0		90.4	84-123		2.69	30	
Trichlorofluoromethane	38.1		"	50.0		76.3	62-140		3.93	30	
Vinyl Chloride	36.1		"	50.0		72.1	52-130		2.70	30	
Surrogate: SURR: 1,2-Dichloroethane-d4	*54.2*		*"*	*50.0*		*108*	*77-125*				
Surrogate: SURR: Toluene-d8	*47.8*		*"*	*50.0*		*95.6*	*85-120*				
Surrogate: SURR: p-Bromofluorobenzene	*45.0*		*"*	*50.0*		*89.9*	*76-130*				
Batch BC60518 - EPA 5035A											
Blank (BC60518-BLK1) Blank									Prepared & Analyzed: 03/11/2026		
1,1,1,2-Tetrachloroethane	ND	0.0050	mg/kg wet								
1,1,1-Trichloroethane	ND	0.0050	"								
1,1,2,2-Tetrachloroethane	ND	0.0050	"								
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.0050	"								
1,1,2-Trichloroethane	ND	0.0050	"								
1,1-Dichloroethane	ND	0.0050	"								
1,1-Dichloroethylene	ND	0.0050	"								
1,2,3-Trichlorobenzene	ND	0.0050	"								
1,2,3-Trichloropropane	ND	0.0050	"								
1,2,4-Trichlorobenzene	ND	0.0050	"								
1,2,4-Trimethylbenzene	ND	0.0050	"								
1,2-Dibromo-3-chloropropane	ND	0.0050	"								
1,2-Dibromoethane	ND	0.0050	"								
1,2-Dichlorobenzene	ND	0.0050	"								
1,2-Dichloroethane	ND	0.0050	"								
1,2-Dichloropropane	ND	0.0050	"								
1,3,5-Trimethylbenzene	ND	0.0050	"								
1,3-Dichlorobenzene	ND	0.0050	"								
1,4-Dichlorobenzene	ND	0.0050	"								
2-Butanone	ND	0.0050	"								
2-Hexanone	ND	0.0050	"								
4-Methyl-2-pentanone	ND	0.0050	"								
Acetone	ND	0.010	"								
Acrolein	ND	0.010	"								
Acrylonitrile	ND	0.0050	"								
Benzene	ND	0.0050	"								
Bromochloromethane	ND	0.0050	"								
Bromodichloromethane	ND	0.0050	"								
Bromoform	ND	0.0050	"								

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Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BC60518 - EPA 5035A											
Blank (BC60518-BLK1) Blank									Prepared & Analyzed: 03/11/2026		
Bromomethane	ND	0.0050	mg/kg wet								
Carbon disulfide	ND	0.0050	"								
Carbon tetrachloride	ND	0.0050	"								
Chlorobenzene	ND	0.0050	"								
Chloroethane	ND	0.0050	"								
Chloroform	ND	0.0050	"								
Chloromethane	ND	0.0050	"								
cis-1,2-Dichloroethylene	ND	0.0050	"								
cis-1,3-Dichloropropylene	ND	0.0050	"								
Cyclohexane	ND	0.0050	"								
Dibromochloromethane	ND	0.0050	"								
Dibromomethane	ND	0.0050	"								
Dichlorodifluoromethane	ND	0.0050	"								
Ethyl Benzene	ND	0.0050	"								
Hexachlorobutadiene	ND	0.0050	"								
Isopropylbenzene	ND	0.0050	"								
Methyl acetate	ND	0.0050	"								
Methyl tert-butyl ether (MTBE)	ND	0.0050	"								
Methylcyclohexane	ND	0.0050	"								
Methylene chloride	ND	0.010	"								
n-Butylbenzene	ND	0.0050	"								
n-Propylbenzene	ND	0.0050	"								
o-Xylene	ND	0.0050	"								
p- & m- Xylenes	ND	0.010	"								
p-Isopropyltoluene	ND	0.0050	"								
sec-Butylbenzene	ND	0.0050	"								
Styrene	ND	0.0050	"								
tert-Butyl alcohol (TBA)	ND	0.025	"								
tert-Butylbenzene	ND	0.0050	"								
Tetrachloroethylene	ND	0.0050	"								
Toluene	ND	0.0050	"								
trans-1,2-Dichloroethylene	ND	0.0050	"								
trans-1,3-Dichloropropylene	ND	0.0050	"								
Trichloroethylene	ND	0.0050	"								
Trichlorofluoromethane	ND	0.0050	"								
Vinyl Chloride	ND	0.0050	"								
Xylenes, Total	ND	0.015	"								
Surrogate: SURR: 1,2-Dichloroethane-d4	*54.6*		*ug/L*	*50.0*		*109*	*77-125*				
Surrogate: SURR: Toluene-d8	*47.2*		*"*	*50.0*		*94.3*	*85-120*				
Surrogate: SURR: p-Bromofluorobenzene	*44.1*		*"*	*50.0*		*88.3*	*76-130*				

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BC60518 - EPA 5035A											
LCS (BC60518-BS1) LCS							Prepared & Analyzed: 03/11/2026				
1,1,1,2-Tetrachloroethane	54.0		ug/L	50.0		108	75-129				
1,1,1-Trichloroethane	60.6		"	50.0		121	71-137				
1,1,2,2-Tetrachloroethane	40.1		"	50.0		80.2	79-129				
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	35.3		"	50.0		70.6	58-146				
1,1,2-Trichloroethane	47.4		"	50.0		94.8	83-123				
1,1-Dichloroethane	49.9		"	50.0		99.8	75-130				
1,1-Dichloroethylene	39.9		"	50.0		79.8	64-137				
1,2,3-Trichlorobenzene	60.6		"	50.0		121	81-140				
1,2,3-Trichloropropane	47.8		"	50.0		95.6	81-126				
1,2,4-Trichlorobenzene	62.4		"	50.0		125	80-141				
1,2,4-Trimethylbenzene	45.0		"	50.0		89.9	84-125				
1,2-Dibromo-3-chloropropane	40.4		"	50.0		80.8	74-142				
1,2-Dibromoethane	51.9		"	50.0		104	86-123				
1,2-Dichlorobenzene	47.1		"	50.0		94.3	85-122				
1,2-Dichloroethane	51.4		"	50.0		103	71-133				
1,2-Dichloropropane	38.6		"	50.0		77.2	81-122	Low Bias			
1,3,5-Trimethylbenzene	45.8		"	50.0		91.6	82-126				
1,3-Dichlorobenzene	50.9		"	50.0		102	84-124				
1,4-Dichlorobenzene	52.7		"	50.0		105	84-124				
2-Butanone	47.0		"	50.0		94.0	58-147				
2-Hexanone	39.2		"	50.0		78.4	70-139				
4-Methyl-2-pentanone	38.4		"	50.0		76.7	72-132				
Acetone	44.5		"	50.0		88.9	36-155				
Acrolein	217		"	200		109	10-238				
Acrylonitrile	46.5		"	50.0		92.9	66-141				
Benzene	49.8		"	50.0		99.7	77-127				
Bromochloromethane	44.0		"	50.0		88.1	74-129				
Bromodichloromethane	47.6		"	50.0		95.2	81-124				
Bromoform	58.1		"	50.0		116	80-136				
Bromomethane	39.3		"	50.0		78.6	32-177				
Carbon disulfide	39.3		"	50.0		78.6	10-136				
Carbon tetrachloride	62.8		"	50.0		126	66-143				
Chlorobenzene	49.6		"	50.0		99.1	86-120				
Chloroethane	47.4		"	50.0		94.9	51-142				
Chloroform	54.1		"	50.0		108	76-131				
Chloromethane	30.7		"	50.0		61.4	49-132				
cis-1,2-Dichloroethylene	50.0		"	50.0		100	74-132				
cis-1,3-Dichloropropylene	45.2		"	50.0		90.3	81-129				
Cyclohexane	42.8		"	50.0		85.6	70-130				
Dibromochloromethane	53.8		"	50.0		108	10-200				
Dibromomethane	46.6		"	50.0		93.2	83-124				
Dichlorodifluoromethane	40.0		"	50.0		80.1	28-158				
Ethyl Benzene	46.0		"	50.0		91.9	84-125				
Hexachlorobutadiene	59.5		"	50.0		119	83-133				
Isopropylbenzene	48.0		"	50.0		95.9	81-127				
Methyl acetate	40.6		"	50.0		81.2	41-143				
Methyl tert-butyl ether (MTBE)	50.7		"	50.0		101	74-131				
Methylcyclohexane	42.0		"	50.0		83.9	70-130				
Methylene chloride	45.2		"	50.0		90.4	57-141				
n-Butylbenzene	41.8		"	50.0		83.7	80-130				

Volatile Organic Compounds by GC/MS - Quality Control Data

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Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BC60518 - EPA 5035A											
LCS (BC60518-BS1) LCS								Prepared & Analyzed: 03/11/2026			
n-Propylbenzene	44.9		ug/L	50.0		89.8	74-136				
o-Xylene	47.0		"	50.0		93.9	83-123				
p- & m- Xylenes	91.5		"	100		91.5	82-128				
p-Isopropyltoluene	44.5		"	50.0		89.0	85-125				
sec-Butylbenzene	46.4		"	50.0		92.8	83-125				
Styrene	49.0		"	50.0		98.0	86-126				
tert-Butyl alcohol (TBA)	275		"	250		110	70-130				
tert-Butylbenzene	49.0		"	50.0		97.9	80-127				
Tetrachloroethylene	57.5		"	50.0		115	80-129				
Toluene	45.6		"	50.0		91.2	85-121				
trans-1,2-Dichloroethylene	49.3		"	50.0		98.6	72-132				
trans-1,3-Dichloropropylene	46.9		"	50.0		93.8	78-132				
Trichloroethylene	46.9		"	50.0		93.7	84-123				
Trichlorofluoromethane	36.8		"	50.0		73.5	62-140				
Vinyl Chloride	34.0		"	50.0		68.0	52-130				
Surrogate: SURR: 1,2-Dichloroethane-d4	*53.4*		*"*	*50.0*		*107*	*77-125*				
Surrogate: SURR: Toluene-d8	*47.1*		*"*	*50.0*		*94.3*	*85-120*				
Surrogate: SURR: p-Bromofluorobenzene	*45.0*		*"*	*50.0*		*89.9*	*76-130*				
LCS Dup (BC60518-BSD1) LCS Dup								Prepared & Analyzed: 03/11/2026			
1,1,1,2-Tetrachloroethane	53.7		ug/L	50.0		107	75-129		0.594	30	
1,1,1-Trichloroethane	59.9		"	50.0		120	71-137		1.23	30	
1,1,2,2-Tetrachloroethane	41.0		"	50.0		82.1	79-129		2.32	30	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	34.6		"	50.0		69.1	58-146		2.06	30	
1,1,2-Trichloroethane	48.6		"	50.0		97.3	83-123		2.60	30	
1,1-Dichloroethane	50.0		"	50.0		99.9	75-130		0.140	30	
1,1-Dichloroethylene	39.4		"	50.0		78.8	64-137		1.31	30	
1,2,3-Trichlorobenzene	58.8		"	50.0		118	81-140		3.10	30	
1,2,3-Trichloropropane	48.9		"	50.0		97.9	81-126		2.36	30	
1,2,4-Trichlorobenzene	59.1		"	50.0		118	80-141		5.43	30	
1,2,4-Trimethylbenzene	42.9		"	50.0		85.7	84-125		4.78	30	
1,2-Dibromo-3-chloropropane	42.3		"	50.0		84.5	74-142		4.52	30	
1,2-Dibromoethane	53.0		"	50.0		106	86-123		2.13	30	
1,2-Dichlorobenzene	46.5		"	50.0		93.0	85-122		1.39	30	
1,2-Dichloroethane	52.8		"	50.0		106	71-133		2.73	30	
1,2-Dichloropropane	38.8		"	50.0		77.6	81-122	Low Bias	0.517	30	
1,3,5-Trimethylbenzene	43.6		"	50.0		87.2	82-126		4.90	30	
1,3-Dichlorobenzene	49.7		"	50.0		99.4	84-124		2.40	30	
1,4-Dichlorobenzene	51.6		"	50.0		103	84-124		2.23	30	
2-Butanone	50.7		"	50.0		101	58-147		7.68	30	
2-Hexanone	40.6		"	50.0		81.3	70-139		3.58	30	
4-Methyl-2-pentanone	40.1		"	50.0		80.2	72-132		4.44	30	
Acetone	47.7		"	50.0		95.4	36-155		7.03	30	
Acrolein	229		"	200		114	10-238		5.15	30	
Acrylonitrile	48.5		"	50.0		97.0	66-141		4.25	30	
Benzene	49.5		"	50.0		99.0	77-127		0.725	30	
Bromochloromethane	44.4		"	50.0		88.8	74-129		0.769	30	
Bromodichloromethane	47.9		"	50.0		95.8	81-124		0.608	30	
Bromoform	60.9		"	50.0		122	80-136		4.62	30	
Bromomethane	39.8		"	50.0		79.5	32-177		1.16	30	

Volatile Organic Compounds by GC/MS - Quality Control Data

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Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BC60518 - EPA 5035A											
LCS Dup (BC60518-BSD1) LCS Dup							Prepared & Analyzed: 03/11/2026				
Carbon disulfide	39.2		ug/L	50.0		78.5	10-136		0.178	30	
Carbon tetrachloride	62.0		"	50.0		124	66-143		1.28	30	
Chlorobenzene	48.8		"	50.0		97.6	86-120		1.53	30	
Chloroethane	47.0		"	50.0		94.0	51-142		0.974	30	
Chloroform	54.3		"	50.0		109	76-131		0.314	30	
Chloromethane	30.4		"	50.0		60.8	49-132		1.05	30	
cis-1,2-Dichloroethylene	50.0		"	50.0		100	74-132		0.140	30	
cis-1,3-Dichloropropylene	45.6		"	50.0		91.2	81-129		0.970	30	
Cyclohexane	41.4		"	50.0		82.7	70-130		3.42	30	
Dibromochloromethane	54.6		"	50.0		109	10-200		1.48	30	
Dibromomethane	47.8		"	50.0		95.6	83-124		2.59	30	
Dichlorodifluoromethane	39.8		"	50.0		79.5	28-158		0.677	30	
Ethyl Benzene	44.7		"	50.0		89.4	84-125		2.85	30	
Hexachlorobutadiene	50.2		"	50.0		100	83-133		16.9	30	
Isopropylbenzene	45.5		"	50.0		90.9	81-127		5.37	30	
Methyl acetate	42.8		"	50.0		85.5	41-143		5.13	30	
Methyl tert-butyl ether (MTBE)	52.4		"	50.0		105	74-131		3.30	30	
Methylcyclohexane	38.7		"	50.0		77.5	70-130		8.03	30	
Methylene chloride	46.1		"	50.0		92.1	57-141		1.88	30	
n-Butylbenzene	38.3		"	50.0		76.6	80-130	Low Bias	8.86	30	
n-Propylbenzene	42.5		"	50.0		85.0	74-136		5.58	30	
o-Xylene	46.0		"	50.0		92.0	83-123		2.09	30	
p- & m- Xylenes	89.1		"	100		89.1	82-128		2.64	30	
p-Isopropyltoluene	41.2		"	50.0		82.4	85-125	Low Bias	7.63	30	
sec-Butylbenzene	42.7		"	50.0		85.5	83-125		8.24	30	
Styrene	48.4		"	50.0		96.8	86-126		1.25	30	
tert-Butyl alcohol (TBA)	284		"	250		114	70-130		3.27	30	
tert-Butylbenzene	45.1		"	50.0		90.2	80-127		8.23	30	
Tetrachloroethylene	56.1		"	50.0		112	80-129		2.39	30	
Toluene	44.8		"	50.0		89.7	85-121		1.66	30	
trans-1,2-Dichloroethylene	49.0		"	50.0		98.0	72-132		0.651	30	
trans-1,3-Dichloropropylene	47.7		"	50.0		95.5	78-132		1.71	30	
Trichloroethylene	46.2		"	50.0		92.3	84-123		1.51	30	
Trichlorofluoromethane	36.3		"	50.0		72.5	62-140		1.40	30	
Vinyl Chloride	33.6		"	50.0		67.2	52-130		1.07	30	
Surrogate: SURR: 1,2-Dichloroethane-d4	*54.4*		*"*	*50.0*		*109*	*77-125*				
Surrogate: SURR: Toluene-d8	*46.9*		*"*	*50.0*		*93.8*	*85-120*				
Surrogate: SURR: p-Bromofluorobenzene	*44.6*		*"*	*50.0*		*89.2*	*76-130*				

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BC60560 - EPA 5035A

Blank (BC60560-BLK2) Blank — Prepared & Analyzed: 03/11/2026

1,1,1,2-Tetrachloroethane	ND	0.50	mg/kg wet
1,1,1-Trichloroethane	ND	0.50	"
1,1,2,2-Tetrachloroethane	ND	0.50	"
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"
1,1,2-Trichloroethane	ND	0.50	"
1,1-Dichloroethane	ND	0.50	"
1,1-Dichloroethylene	ND	0.50	"
1,2,3-Trichlorobenzene	ND	0.50	"
1,2,3-Trichloropropane	ND	0.50	"
1,2,4-Trichlorobenzene	ND	0.50	"
1,2,4-Trimethylbenzene	ND	0.50	"
1,2-Dibromo-3-chloropropane	ND	0.50	"
1,2-Dibromoethane	ND	0.50	"
1,2-Dichlorobenzene	ND	0.50	"
1,2-Dichloroethane	ND	0.50	"
1,2-Dichloropropane	ND	0.50	"
1,3,5-Trimethylbenzene	ND	0.50	"
1,3-Dichlorobenzene	ND	0.50	"
1,4-Dichlorobenzene	ND	0.50	"
2-Butanone	ND	0.50	"
2-Hexanone	ND	0.50	"
4-Methyl-2-pentanone	ND	0.50	"
Acetone	ND	1.0	"
Acrolein	ND	1.0	"
Acrylonitrile	ND	0.50	"
Benzene	ND	0.50	"
Bromochloromethane	ND	0.50	"
Bromodichloromethane	ND	0.50	"
Bromoform	ND	0.50	"
Bromomethane	ND	0.50	"
Carbon disulfide	ND	0.50	"
Carbon tetrachloride	ND	0.50	"
Chlorobenzene	ND	0.50	"
Chloroethane	ND	0.50	"
Chloroform	ND	0.50	"
Chloromethane	ND	0.50	"
cis-1,2-Dichloroethylene	ND	0.50	"
cis-1,3-Dichloropropylene	ND	0.50	"
Cyclohexane	ND	0.50	"
Dibromochloromethane	ND	0.50	"
Dibromomethane	ND	0.50	"
Dichlorodifluoromethane	ND	0.50	"
Ethyl Benzene	ND	0.50	"
Hexachlorobutadiene	ND	0.50	"
Isopropylbenzene	ND	0.50	"
Methyl acetate	ND	0.50	"
Methyl tert-butyl ether (MTBE)	ND	0.50	"
Methylcyclohexane	ND	0.50	"
Methylene chloride	ND	1.0	"
n-Butylbenzene	ND	0.50	"

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BC60560 - EPA 5035A											
Blank (BC60560-BLK2) Blank								Prepared & Analyzed: 03/11/2026			
n-Propylbenzene	ND	0.50	mg/kg wet								
o-Xylene	ND	0.50	"								
p- & m- Xylenes	ND	1.0	"								
p-Isopropyltoluene	ND	0.50	"								
sec-Butylbenzene	ND	0.50	"								
Styrene	ND	0.50	"								
tert-Butyl alcohol (TBA)	ND	2.5	"								
tert-Butylbenzene	ND	0.50	"								
Tetrachloroethylene	ND	0.50	"								
Toluene	ND	0.50	"								
trans-1,2-Dichloroethylene	ND	0.50	"								
trans-1,3-Dichloropropylene	ND	0.50	"								
Trichloroethylene	ND	0.50	"								
Trichlorofluoromethane	ND	0.50	"								
Vinyl Chloride	ND	0.50	"								
Xylenes, Total	ND	1.5	"								
Surrogate: SURR: 1,2-Dichloroethane-d4	*55.2*		*ug/L*	*50.0*		*110*	*77-125*				
Surrogate: SURR: Toluene-d8	*47.1*		*"*	*50.0*		*94.2*	*85-120*				
Surrogate: SURR: p-Bromofluorobenzene	*44.4*		*"*	*50.0*		*88.9*	*76-130*				
LCS (BC60560-BS2) LCS								Prepared & Analyzed: 03/11/2026			
1,1,1,2-Tetrachloroethane	50.6		ug/L	50.0		101	75-129				
1,1,1-Trichloroethane	58.0		"	50.0		116	71-137				
1,1,2,2-Tetrachloroethane	35.7		"	50.0		71.3	79-129	Low Bias			
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	49.8		"	50.0		99.6	58-146				
1,1,2-Trichloroethane	42.7		"	50.0		85.4	83-123				
1,1-Dichloroethane	46.0		"	50.0		92.0	75-130				
1,1-Dichloroethylene	48.0		"	50.0		96.0	64-137				
1,2,3-Trichlorobenzene	52.3		"	50.0		105	81-140				
1,2,3-Trichloropropane	42.6		"	50.0		85.2	81-126				
1,2,4-Trichlorobenzene	52.9		"	50.0		106	80-141				
1,2,4-Trimethylbenzene	41.2		"	50.0		82.4	84-125	Low Bias			
1,2-Dibromo-3-chloropropane	35.2		"	50.0		70.4	74-142	Low Bias			
1,2-Dibromoethane	46.2		"	50.0		92.4	86-123				
1,2-Dichlorobenzene	44.3		"	50.0		88.5	85-122				
1,2-Dichloroethane	47.9		"	50.0		95.8	71-133				
1,2-Dichloropropane	34.4		"	50.0		68.8	81-122	Low Bias			
1,3,5-Trimethylbenzene	42.2		"	50.0		84.3	82-126				
1,3-Dichlorobenzene	44.9		"	50.0		89.8	84-124				
1,4-Dichlorobenzene	48.7		"	50.0		97.5	84-124				
2-Butanone	41.8		"	50.0		83.5	58-147				
2-Hexanone	30.5		"	50.0		61.1	70-139	Low Bias			
4-Methyl-2-pentanone	29.8		"	50.0		59.6	72-132	Low Bias			
Acetone	54.8		"	50.0		110	36-155				
Acrolein	192		"	200		96.2	10-238				
Acrylonitrile	43.9		"	50.0		87.8	66-141				
Benzene	45.8		"	50.0		91.7	77-127				
Bromochloromethane	39.2		"	50.0		78.3	74-129				
Bromodichloromethane	44.0		"	50.0		88.1	81-124				
Bromoform	51.8		"	50.0		104	80-136				

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BC60560 - EPA 5035A											
LCS (BC60560-BS2) LCS							Prepared & Analyzed: 03/11/2026				
Bromomethane	102		ug/L	50.0		203	32-177	High Bias			
Carbon disulfide	56.0		"	50.0		112	10-136				
Carbon tetrachloride	61.5		"	50.0		123	66-143				
Chlorobenzene	45.2		"	50.0		90.4	86-120				
Chloroethane	29.0		"	50.0		58.1	51-142				
Chloroform	50.6		"	50.0		101	76-131				
Chloromethane	30.1		"	50.0		60.3	49-132				
cis-1,2-Dichloroethylene	45.7		"	50.0		91.4	74-132				
cis-1,3-Dichloropropylene	42.4		"	50.0		84.8	81-129				
Cyclohexane	43.6		"	50.0		87.3	70-130				
Dibromochloromethane	49.0		"	50.0		97.9	10-200				
Dibromomethane	44.0		"	50.0		88.0	83-124				
Dichlorodifluoromethane	38.2		"	50.0		76.5	28-158				
Ethyl Benzene	41.9		"	50.0		83.7	84-125	Low Bias			
Hexachlorobutadiene	57.3		"	50.0		115	83-133				
Isopropylbenzene	42.1		"	50.0		84.2	81-127				
Methyl acetate	43.2		"	50.0		86.4	41-143				
Methyl tert-butyl ether (MTBE)	45.0		"	50.0		90.1	74-131				
Methylcyclohexane	40.8		"	50.0		81.7	70-130				
Methylene chloride	44.6		"	50.0		89.1	57-141				
n-Butylbenzene	39.4		"	50.0		78.7	80-130	Low Bias			
n-Propylbenzene	40.7		"	50.0		81.3	74-136				
o-Xylene	41.6		"	50.0		83.3	83-123				
p- & m- Xylenes	85.4		"	100		85.4	82-128				
p-Isopropyltoluene	43.2		"	50.0		86.3	85-125				
sec-Butylbenzene	42.3		"	50.0		84.6	83-125				
Styrene	43.0		"	50.0		86.1	86-126				
tert-Butyl alcohol (TBA)	97.5		"	250		39.0	70-130	Low Bias			
tert-Butylbenzene	44.0		"	50.0		88.1	80-127				
Tetrachloroethylene	44.5		"	50.0		89.0	80-129				
Toluene	41.9		"	50.0		83.7	85-121	Low Bias			
trans-1,2-Dichloroethylene	47.6		"	50.0		95.2	72-132				
trans-1,3-Dichloropropylene	40.7		"	50.0		81.5	78-132				
Trichloroethylene	42.7		"	50.0		85.4	84-123				
Trichlorofluoromethane	41.5		"	50.0		83.1	62-140				
Vinyl Chloride	34.0		"	50.0		68.0	52-130				
Surrogate: SURR: 1,2-Dichloroethane-d4	*53.8*		*"*	*50.0*		*108*	*77-125*				
Surrogate: SURR: Toluene-d8	*47.8*		*"*	*50.0*		*95.5*	*85-120*				
Surrogate: SURR: p-Bromofluorobenzene	*43.2*		*"*	*50.0*		*86.3*	*76-130*				

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BC60560 - EPA 5035A											
LCS Dup (BC60560-BSD2) LCS Dup							Prepared & Analyzed: 03/11/2026				
1,1,1,2-Tetrachloroethane	54.2		ug/L	50.0		108	75-129		6.68	30	
1,1,1-Trichloroethane	62.8		"	50.0		126	71-137		8.03	30	
1,1,2,2-Tetrachloroethane	37.8		"	50.0		75.6	79-129	Low Bias	5.77	30	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	57.3		"	50.0		115	58-146		14.1	30	
1,1,2-Trichloroethane	45.1		"	50.0		90.2	83-123		5.54	30	
1,1-Dichloroethane	50.2		"	50.0		100	75-130		8.81	30	
1,1-Dichloroethylene	54.3		"	50.0		109	64-137		12.2	30	
1,2,3-Trichlorobenzene	55.5		"	50.0		111	81-140		5.99	30	
1,2,3-Trichloropropane	43.7		"	50.0		87.3	81-126		2.48	30	
1,2,4-Trichlorobenzene	55.6		"	50.0		111	80-141		4.96	30	
1,2,4-Trimethylbenzene	44.2		"	50.0		88.3	84-125		6.96	30	
1,2-Dibromo-3-chloropropane	35.6		"	50.0		71.1	74-142	Low Bias	1.10	30	
1,2-Dibromoethane	48.6		"	50.0		97.2	86-123		5.00	30	
1,2-Dichlorobenzene	47.2		"	50.0		94.5	85-122		6.47	30	
1,2-Dichloroethane	50.4		"	50.0		101	71-133		4.99	30	
1,2-Dichloropropane	37.1		"	50.0		74.2	81-122	Low Bias	7.58	30	
1,3,5-Trimethylbenzene	45.6		"	50.0		91.2	82-126		7.86	30	
1,3-Dichlorobenzene	47.8		"	50.0		95.6	84-124		6.23	30	
1,4-Dichlorobenzene	51.7		"	50.0		103	84-124		5.97	30	
2-Butanone	42.8		"	50.0		85.6	58-147		2.46	30	
2-Hexanone	31.4		"	50.0		62.8	70-139	Low Bias	2.81	30	
4-Methyl-2-pentanone	31.0		"	50.0		61.9	72-132	Low Bias	3.78	30	
Acetone	54.3		"	50.0		109	36-155		1.03	30	
Acrolein	277		"	200		139	10-238		36.1	30	Non-dir.
Acrylonitrile	45.1		"	50.0		90.2	66-141		2.70	30	
Benzene	49.6		"	50.0		99.2	77-127		7.86	30	
Bromochloromethane	42.2		"	50.0		84.4	74-129		7.43	30	
Bromodichloromethane	47.5		"	50.0		95.0	81-124		7.54	30	
Bromoform	54.9		"	50.0		110	80-136		5.66	30	
Bromomethane	138		"	50.0		276	32-177	High Bias	30.4	30	Non-dir.
Carbon disulfide	68.8		"	50.0		138	10-136	High Bias	20.5	30	
Carbon tetrachloride	66.7		"	50.0		133	66-143		8.05	30	
Chlorobenzene	48.5		"	50.0		96.9	86-120		6.96	30	
Chloroethane	47.8		"	50.0		95.7	51-142		48.9	30	Non-dir.
Chloroform	53.9		"	50.0		108	76-131		6.47	30	
Chloromethane	50.5		"	50.0		101	49-132		50.6	30	Non-dir.
cis-1,2-Dichloroethylene	49.2		"	50.0		98.4	74-132		7.33	30	
cis-1,3-Dichloropropylene	45.6		"	50.0		91.1	81-129		7.19	30	
Cyclohexane	50.6		"	50.0		101	70-130		14.8	30	
Dibromochloromethane	51.9		"	50.0		104	10-200		5.93	30	
Dibromomethane	46.7		"	50.0		93.4	83-124		5.95	30	
Dichlorodifluoromethane	114		"	50.0		229	28-158	High Bias	99.7	30	Non-dir.
Ethyl Benzene	45.2		"	50.0		90.3	84-125		7.61	30	
Hexachlorobutadiene	61.3		"	50.0		123	83-133		6.73	30	
Isopropylbenzene	45.8		"	50.0		91.7	81-127		8.51	30	
Methyl acetate	45.7		"	50.0		91.3	41-143		5.54	30	
Methyl tert-butyl ether (MTBE)	48.3		"	50.0		96.7	74-131		7.05	30	
Methylcyclohexane	47.3		"	50.0		94.6	70-130		14.6	30	
Methylene chloride	47.1		"	50.0		94.1	57-141		5.48	30	
n-Butylbenzene	42.4		"	50.0		84.7	80-130		7.32	30	

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BC60560 - EPA 5035A											
LCS Dup (BC60560-BSD2) LCS Dup								Prepared & Analyzed: 03/11/2026			
n-Propylbenzene	43.7		ug/L	50.0		87.5	74-136		7.25	30	
o-Xylene	44.6		"	50.0		89.3	83-123		6.95	30	
p- & m- Xylenes	91.1		"	100		91.1	82-128		6.36	30	
p-Isopropyltoluene	46.7		"	50.0		93.3	85-125		7.79	30	
sec-Butylbenzene	46.0		"	50.0		91.9	83-125		8.25	30	
Styrene	45.8		"	50.0		91.6	86-126		6.15	30	
tert-Butyl alcohol (TBA)	154		"	250		61.6	70-130	Low Bias	45.0	30	Non-dir.
tert-Butylbenzene	47.9		"	50.0		95.8	80-127		8.33	30	
Tetrachloroethylene	48.0		"	50.0		96.0	80-129		7.54	30	
Toluene	45.3		"	50.0		90.6	85-121		7.92	30	
trans-1,2-Dichloroethylene	52.9		"	50.0		106	72-132		10.4	30	
trans-1,3-Dichloropropylene	43.2		"	50.0		86.5	78-132		5.96	30	
Trichloroethylene	46.9		"	50.0		93.8	84-123		9.46	30	
Trichlorofluoromethane	53.1		"	50.0		106	62-140		24.5	30	
Vinyl Chloride	53.4		"	50.0		107	52-130		44.4	30	Non-dir.
Surrogate: SURR: 1,2-Dichloroethane-d4	*53.2*		*"*	*50.0*		*106*	*77-125*				
Surrogate: SURR: Toluene-d8	*48.1*		*"*	*50.0*		*96.2*	*85-120*				
Surrogate: SURR: p-Bromofluorobenzene	*43.2*		*"*	*50.0*		*86.5*	*76-130*				

Semivolatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BC60159 - EPA 3550C

Blank (BC60159-BLK1) Blank — Prepared & Analyzed: 03/04/2026

1,1-Biphenyl	ND	0.0416	mg/kg wet
1,2,4,5-Tetrachlorobenzene	ND	0.0830	"
1,2-Diphenylhydrazine (as Azobenzene)	ND	0.0416	"
2,3,4,6-Tetrachlorophenol	ND	0.0830	"
2,4,5-Trichlorophenol	ND	0.0416	"
2,4,6-Trichlorophenol	ND	0.0416	"
2,4-Dichlorophenol	ND	0.0416	"
2,4-Dimethylphenol	ND	0.0416	"
2,4-Dinitrophenol	ND	0.0830	"
2,4-Dinitrotoluene	ND	0.0416	"
2,6-Dinitrotoluene	ND	0.0416	"
2-Chloronaphthalene	ND	0.0416	"
2-Chlorophenol	ND	0.0416	"
2-Methylnaphthalene	ND	0.0416	"
2-Methylphenol	ND	0.0416	"
2-Nitroaniline	ND	0.0830	"
2-Nitrophenol	ND	0.0416	"
3- & 4-Methylphenols	ND	0.0416	"
3,3-Dichlorobenzidine	ND	0.0416	"
3-Nitroaniline	ND	0.0830	"
4,6-Dinitro-2-methylphenol	ND	0.0830	"
4-Bromophenyl phenyl ether	ND	0.0416	"
4-Chloro-3-methylphenol	ND	0.0416	"
4-Chloroaniline	ND	0.0416	"
4-Chlorophenyl phenyl ether	ND	0.0416	"
4-Nitroaniline	ND	0.0830	"
4-Nitrophenol	ND	0.0830	"
Acenaphthene	ND	0.0416	"
Acenaphthylene	ND	0.0416	"
Acetophenone	ND	0.0416	"
Aniline	ND	0.166	"
Anthracene	ND	0.0416	"
Atrazine	ND	0.0416	"
Benzaldehyde	ND	0.0416	"
Benzidine	ND	0.166	"
Benzo(a)anthracene	ND	0.0416	"
Benzo(a)pyrene	ND	0.0416	"
Benzo(b)fluoranthene	ND	0.0416	"
Benzo(g,h,i)perylene	ND	0.0416	"
Benzo(k)fluoranthene	ND	0.0416	"
Benzoic acid	ND	0.0416	"
Benzyl alcohol	ND	0.0416	"
Benzyl butyl phthalate	ND	0.0416	"
Bis(2-chloroethoxy)methane	ND	0.0416	"
Bis(2-chloroethyl)ether	ND	0.0416	"
Bis(2-chloroisopropyl)ether	ND	0.0416	"
Bis(2-ethylhexyl)phthalate	ND	0.0416	"
Caprolactam	ND	0.0830	"
Carbazole	ND	0.0416	"
Chrysene	ND	0.0416	"

Semivolatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BC60159 - EPA 3550C											
Blank (BC60159-BLK1) Blank								Prepared & Analyzed: 03/04/2026			
Dibenzo(a,h)anthracene	ND	0.0416	mg/kg wet								
Dibenzofuran	ND	0.0416	"								
Diethyl phthalate	ND	0.0416	"								
Dimethyl phthalate	ND	0.0416	"								
Di-n-butyl phthalate	ND	0.0416	"								
Di-n-octyl phthalate	ND	0.0416	"								
Diphenylamine	ND	0.0830	"								
Fluoranthene	ND	0.0416	"								
Fluorene	ND	0.0416	"								
Hexachlorobenzene	ND	0.0416	"								
Hexachlorobutadiene	ND	0.0416	"								
Hexachlorocyclopentadiene	ND	0.0416	"								
Hexachloroethane	ND	0.0416	"								
Indeno(1,2,3-cd)pyrene	ND	0.0416	"								
Isophorone	ND	0.0416	"								
Naphthalene	ND	0.0416	"								
Nitrobenzene	ND	0.0416	"								
N-Nitrosodimethylamine	ND	0.0416	"								
N-nitroso-di-n-propylamine	ND	0.0416	"								
N-Nitrosodiphenylamine	ND	0.0416	"								
Pentachlorophenol	ND	0.0416	"								
Phenanthrene	ND	0.0416	"								
Phenol	ND	0.0416	"								
Pyrene	ND	0.0416	"								
Pyridine	ND	0.166	"								
Surrogate: SURR: 2-Fluorophenol	*0.833*		"	*1.66*		*50.1*	*20-108*				
Surrogate: SURR: Phenol-d6	*0.794*		"	*1.66*		*47.8*	*23-114*				
Surrogate: SURR: Nitrobenzene-d5	*0.449*		"	*0.831*		*54.0*	*22-108*				
Surrogate: SURR: 2-Fluorobiphenyl	*0.455*		"	*0.831*		*54.8*	*21-113*				
Surrogate: SURR: 2,4,6-Tribromophenol	*0.776*		"	*1.66*		*46.7*	*19-110*				
Surrogate: SURR: Terphenyl-d14	*0.530*		"	*0.831*		*63.8*	*24-116*				

Semivolatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BC60159 - EPA 3550C											
LCS (BC60159-BS1) LCS							Prepared & Analyzed: 03/04/2026				
1,1-Biphenyl	0.369	0.0416	mg/kg wet	0.831		44.4	18-111				
1,2,4,5-Tetrachlorobenzene	0.370	0.0830	"	0.831		44.5	21-131				
1,2-Diphenylhydrazine (as Azobenzene)	0.332	0.0416	"	0.831		39.9	17-137				
2,3,4,6-Tetrachlorophenol	0.368	0.0830	"	0.831		44.3	30-130				
2,4,5-Trichlorophenol	0.381	0.0416	"	0.831		45.8	27-118				
2,4,6-Trichlorophenol	0.361	0.0416	"	0.831		43.5	31-120				
2,4-Dichlorophenol	0.397	0.0416	"	0.831		47.8	20-127				
2,4-Dimethylphenol	0.422	0.0416	"	0.831		50.8	14-132				
2,4-Dinitrophenol	0.315	0.0830	"	0.831		37.9	10-171				
2,4-Dinitrotoluene	0.363	0.0416	"	0.831		43.7	34-131				
2,6-Dinitrotoluene	0.366	0.0416	"	0.831		44.0	31-128				
2-Chloronaphthalene	0.360	0.0416	"	0.831		43.4	31-117				
2-Chlorophenol	0.371	0.0416	"	0.831		44.6	33-113				
2-Methylnaphthalene	0.355	0.0416	"	0.831		42.8	12-138				
2-Methylphenol	0.383	0.0416	"	0.831		46.2	10-136				
2-Nitroaniline	0.373	0.0830	"	0.831		44.9	27-132				
2-Nitrophenol	0.366	0.0416	"	0.831		44.1	17-129				
3- & 4-Methylphenols	0.325	0.0416	"	0.831		39.2	29-103				
3,3-Dichlorobenzidine	0.268	0.0416	"	0.831		32.3	22-149				
3-Nitroaniline	0.296	0.0830	"	0.831		35.6	20-133				
4,6-Dinitro-2-methylphenol	0.342	0.0830	"	0.831		41.2	10-143				
4-Bromophenyl phenyl ether	0.347	0.0416	"	0.831		41.8	29-120				
4-Chloro-3-methylphenol	0.388	0.0416	"	0.831		46.7	24-129				
4-Chloroaniline	0.256	0.0416	"	0.831		30.9	10-132				
4-Chlorophenyl phenyl ether	0.359	0.0416	"	0.831		43.2	27-124				
4-Nitroaniline	0.323	0.0830	"	0.831		38.9	16-128				
4-Nitrophenol	0.302	0.0830	"	0.831		36.3	10-141				
Acenaphthene	0.362	0.0416	"	0.831		43.6	30-121				
Acenaphthylene	0.357	0.0416	"	0.831		43.0	30-115				
Acetophenone	0.374	0.0416	"	0.831		45.0	20-112				
Aniline	0.376	0.166	"	0.831		45.3	10-119				
Anthracene	0.410	0.0416	"	0.831		49.4	34-118				
Atrazine	0.393	0.0416	"	0.831		47.3	26-112				
Benzaldehyde	0.365	0.0416	"	0.831		44.0	21-100				
Benzo(a)anthracene	0.389	0.0416	"	0.831		46.9	32-122				
Benzo(a)pyrene	0.364	0.0416	"	0.831		43.9	29-133				
Benzo(b)fluoranthene	0.358	0.0416	"	0.831		43.2	25-133				
Benzo(g,h,i)perylene	0.354	0.0416	"	0.831		42.7	10-143				
Benzo(k)fluoranthene	0.373	0.0416	"	0.831		44.9	25-128				
Benzoic acid	0.0359	0.0416	"	0.831		4.32	10-140	Low Bias			
Benzyl alcohol	0.356	0.0416	"	0.831		42.9	30-115				
Benzyl butyl phthalate	0.391	0.0416	"	0.831		47.0	26-126				
Bis(2-chloroethoxy)methane	0.376	0.0416	"	0.831		45.2	19-132				
Bis(2-chloroethyl)ether	0.351	0.0416	"	0.831		42.3	19-125				
Bis(2-chloroisopropyl)ether	0.347	0.0416	"	0.831		41.8	20-135				
Bis(2-ethylhexyl)phthalate	0.379	0.0416	"	0.831		45.6	10-155				
Caprolactam	0.363	0.0830	"	0.831		43.7	10-127				
Carbazole	0.373	0.0416	"	0.831		45.0	35-123				
Chrysene	0.373	0.0416	"	0.831		45.0	32-123				
Dibenzo(a,h)anthracene	0.357	0.0416	"	0.831		43.0	10-136				

Semivolatile Organic Compounds by GC/MS - Quality Control Data

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Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BC60159 - EPA 3550C											
LCS (BC60159-BS1) LCS							Prepared & Analyzed: 03/04/2026				
Dibenzofuran	0.361	0.0416	mg/kg wet	0.831		43.5	29-121				
Diethyl phthalate	0.358	0.0416	"	0.831		43.1	34-116				
Dimethyl phthalate	0.357	0.0416	"	0.831		43.0	35-124				
Di-n-butyl phthalate	0.365	0.0416	"	0.831		44.0	31-116				
Di-n-octyl phthalate	0.368	0.0416	"	0.831		44.3	26-136				
Diphenylamine	0.423	0.0830	"	0.831		50.9	40-140				
Fluoranthene	0.362	0.0416	"	0.831		43.6	33-122				
Fluorene	0.363	0.0416	"	0.831		43.7	29-123				
Hexachlorobenzene	0.339	0.0416	"	0.831		40.8	21-124				
Hexachlorobutadiene	0.378	0.0416	"	0.831		45.5	10-149				
Hexachlorocyclopentadiene	0.309	0.0416	"	0.831		37.2	10-129				
Hexachloroethane	0.352	0.0416	"	0.831		42.4	28-108				
Indeno(1,2,3-cd)pyrene	0.341	0.0416	"	0.831		41.0	10-135				
Isophorone	0.373	0.0416	"	0.831		44.9	20-132				
Naphthalene	0.379	0.0416	"	0.831		45.6	23-124				
Nitrobenzene	0.356	0.0416	"	0.831		42.9	13-132				
N-Nitrosodimethylamine	0.362	0.0416	"	0.831		43.6	11-129				
N-nitroso-di-n-propylamine	0.354	0.0416	"	0.831		42.7	24-119				
N-Nitrosodiphenylamine	0.417	0.0416	"	0.831		50.2	22-152				
Pentachlorophenol	0.400	0.0416	"	0.831		48.2	10-139				
Phenanthrene	0.372	0.0416	"	0.831		44.8	33-123				
Phenol	0.368	0.0416	"	0.831		44.4	23-115				
Pyrene	0.401	0.0416	"	0.831		48.2	24-130				
Pyridine	0.270	0.166	"	0.831		32.5	10-91				
Surrogate: SURR: 2-Fluorophenol	*0.655*		"	*1.66*		*39.4*	*20-108*				
Surrogate: SURR: Phenol-d6	*0.625*		"	*1.66*		*37.6*	*23-114*				
Surrogate: SURR: Nitrobenzene-d5	*0.350*		"	*0.831*		*42.1*	*22-108*				
Surrogate: SURR: 2-Fluorobiphenyl	*0.353*		"	*0.831*		*42.5*	*21-113*				
Surrogate: SURR: 2,4,6-Tribromophenol	*0.621*		"	*1.66*		*37.4*	*19-110*				
Surrogate: SURR: Terphenyl-d14	*0.390*		"	*0.831*		*47.0*	*24-116*				

Semivolatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BC60190 - EPA 3510C											
Blank (BC60190-BLK1) Blank									Prepared & Analyzed: 03/04/2026		
1,1-Biphenyl	ND	5.00	ug/L								
1,2,4,5-Tetrachlorobenzene	ND	5.00	"								
1,2-Diphenylhydrazine (as Azobenzene)	ND	5.00	"								
2,3,4,6-Tetrachlorophenol	ND	5.00	"								
2,4,5-Trichlorophenol	ND	5.00	"								
2,4,6-Trichlorophenol	ND	5.00	"								
2,4-Dichlorophenol	ND	5.00	"								
2,4-Dimethylphenol	ND	5.00	"								
2,4-Dinitrophenol	ND	5.00	"								
2,4-Dinitrotoluene	ND	5.00	"								
2,6-Dinitrotoluene	ND	5.00	"								
2-Chloronaphthalene	ND	5.00	"								
2-Chlorophenol	ND	5.00	"								
2-Methylnaphthalene	ND	5.00	"								
2-Methylphenol	ND	5.00	"								
2-Nitroaniline	ND	5.00	"								
2-Nitrophenol	ND	5.00	"								
3- & 4-Methylphenols	ND	5.00	"								
3,3-Dichlorobenzidine	ND	5.00	"								
3-Nitroaniline	ND	5.00	"								
4,6-Dinitro-2-methylphenol	ND	5.00	"								
4-Bromophenyl phenyl ether	ND	5.00	"								
4-Chloro-3-methylphenol	ND	5.00	"								
4-Chloroaniline	ND	5.00	"								
4-Chlorophenyl phenyl ether	ND	5.00	"								
4-Nitroaniline	ND	5.00	"								
4-Nitrophenol	ND	5.00	"								
Acetophenone	ND	5.00	"								
Aniline	ND	5.00	"								
Benzaldehyde	ND	5.00	"								
Benzidine	ND	5.00	"								
Benzoic acid	ND	5.00	"								
Benzyl alcohol	ND	5.00	"								
Benzyl butyl phthalate	ND	5.00	"								
Bis(2-chloroethoxy)methane	ND	5.00	"								
Bis(2-chloroethyl)ether	ND	5.00	"								
Bis(2-chloroisopropyl)ether	ND	5.00	"								
Caprolactam	ND	5.00	"								
Carbazole	ND	5.00	"								
Dibenzofuran	ND	5.00	"								
Diethyl phthalate	ND	5.00	"								
Dimethyl phthalate	ND	5.00	"								
Di-n-butyl phthalate	ND	5.00	"								
Di-n-octyl phthalate	ND	5.00	"								
Diphenylamine	ND	5.00	"								
Hexachlorocyclopentadiene	ND	10.0	"								
Isophorone	ND	5.00	"								
N-nitroso-di-n-propylamine	ND	5.00	"								
N-Nitrosodiphenylamine	ND	5.00	"								
Phenol	ND	5.00	"								

Semivolatile Organic Compounds by GC/MS - Quality Control Data

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Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BC60190 - EPA 3510C											
Blank (BC60190-BLK1) Blank								Prepared & Analyzed: 03/04/2026			
Pyridine	ND	5.00	ug/L								
Surrogate: SURR: 2-Fluorophenol	*16.0*		*"*	*50.0*		*32.1*	*19.7-63.1*				
Surrogate: SURR: Phenol-d6	*8.94*		*"*	*50.0*		*17.9*	*10.1-41.7*				
Surrogate: SURR: Nitrobenzene-d5	*15.2*		*"*	*25.0*		*61.0*	*50.2-113*				
Surrogate: SURR: 2-Fluorobiphenyl	*15.4*		*"*	*25.0*		*61.6*	*39.9-105*				
Surrogate: SURR: 2,4,6-Tribromophenol	*36.4*		*"*	*50.0*		*72.7*	*39.3-151*				
Surrogate: SURR: Terphenyl-d14	*23.4*		*"*	*25.0*		*93.7*	*30.7-106*				
LCS (BC60190-BS1) LCS								Prepared & Analyzed: 03/04/2026			
1,1-Biphenyl	15.7	5.00	ug/L	25.0		62.7	33-95				
1,2,4,5-Tetrachlorobenzene	14.4	5.00	"	25.0		57.7	26-120				
1,2-Diphenylhydrazine (as Azobenzene)	16.8	5.00	"	25.0		67.4	16-141				
2,3,4,6-Tetrachlorophenol	19.1	5.00	"	25.0		76.6	30-130				
2,4,5-Trichlorophenol	17.7	5.00	"	25.0		70.6	32-114				
2,4,6-Trichlorophenol	16.1	5.00	"	25.0		64.5	35-118				
2,4-Dichlorophenol	16.5	5.00	"	25.0		66.0	25-116				
2,4-Dimethylphenol	17.3	5.00	"	25.0		69.0	15-116				
2,4-Dinitrophenol	24.7	5.00	"	25.0		98.9	10-170				
2,4-Dinitrotoluene	18.4	5.00	"	25.0		73.6	41-128				
2,6-Dinitrotoluene	18.0	5.00	"	25.0		71.9	45-116				
2-Chloronaphthalene	14.8	5.00	"	25.0		59.2	33-112				
2-Chlorophenol	13.3	5.00	"	25.0		53.1	15-120				
2-Methylnaphthalene	14.0	5.00	"	25.0		56.0	24-118				
2-Methylphenol	12.0	5.00	"	25.0		48.1	10-110				
2-Nitroaniline	18.1	5.00	"	25.0		72.3	34-129				
2-Nitrophenol	14.8	5.00	"	25.0		59.4	28-118				
3- & 4-Methylphenols	9.70	5.00	"	25.0		38.8	10-107				
3,3-Dichlorobenzidine	12.4	5.00	"	25.0		49.4	15-187				
3-Nitroaniline	13.4	5.00	"	25.0		53.8	24-134				
4,6-Dinitro-2-methylphenol	21.0	5.00	"	25.0		84.0	10-153				
4-Bromophenyl phenyl ether	16.4	5.00	"	25.0		65.6	34-120				
4-Chloro-3-methylphenol	17.8	5.00	"	25.0		71.1	20-120				
4-Chloroaniline	12.4	5.00	"	25.0		49.4	10-147				
4-Chlorophenyl phenyl ether	16.7	5.00	"	25.0		66.8	27-121				
4-Nitroaniline	16.4	5.00	"	25.0		65.4	13-134				
4-Nitrophenol	5.93	5.00	"	25.0		23.7	10-131				
Acetophenone	15.2	5.00	"	25.0		60.8	25-110				
Aniline	9.45	5.00	"	25.0		37.8	10-117				
Benzaldehyde	15.7	5.00	"	25.0		63.0	29-117				
Benzoic acid	ND	5.00	"	25.0			30-130	Low Bias			
Benzyl alcohol	10.5	5.00	"	25.0		42.0	10-117				
Benzyl butyl phthalate	20.6	5.00	"	25.0		82.5	29-133				
Bis(2-chloroethoxy)methane	15.9	5.00	"	25.0		63.8	10-154				
Bis(2-chloroethyl)ether	14.0	5.00	"	25.0		56.1	17-125				
Bis(2-chloroisopropyl)ether	13.8	5.00	"	25.0		55.2	10-139				
Caprolactam	17.3	5.00	"	25.0		69.3	10-137				
Carbazole	18.8	5.00	"	25.0		75.1	42-126				
Dibenzofuran	16.8	5.00	"	25.0		67.2	36-113				
Diethyl phthalate	18.4	5.00	"	25.0		73.6	38-115				
Dimethyl phthalate	18.3	5.00	"	25.0		73.4	38-129				

Semivolatile Organic Compounds by GC/MS - Quality Control Data

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Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BC60190 - EPA 3510C											
LCS (BC60190-BS1) LCS							Prepared & Analyzed: 03/04/2026				
Di-n-butyl phthalate	19.1	5.00	ug/L	25.0		76.4	31-120				
Di-n-octyl phthalate	20.5	5.00	"	25.0		82.0	21-149				
Diphenylamine	20.0	5.00	"	25.0		80.2	40-140				
Hexachlorocyclopentadiene	11.5	10.0	"	25.0		46.1	10-130				
Isophorone	17.4	5.00	"	25.0		69.5	25-127				
N-nitroso-di-n-propylamine	15.4	5.00	"	25.0		61.4	26-122				
N-Nitrosodiphenylamine	20.0	5.00	"	25.0		80.2	23-149				
Phenol	4.93	5.00	"	25.0		19.7	10-110				
Pyridine	5.07	5.00	"	35.0		14.5	10-90				
Surrogate: SURR: 2-Fluorophenol	*14.6*		*"*	*50.0*		*29.2*	*19.7-63.1*				
Surrogate: SURR: Phenol-d6	*8.83*		*"*	*50.0*		*17.7*	*10.1-41.7*				
Surrogate: SURR: Nitrobenzene-d5	*14.1*		*"*	*25.0*		*56.3*	*50.2-113*				
Surrogate: SURR: 2-Fluorobiphenyl	*14.8*		*"*	*25.0*		*59.0*	*39.9-105*				
Surrogate: SURR: 2,4,6-Tribromophenol	*33.7*		*"*	*50.0*		*67.4*	*39.3-151*				
Surrogate: SURR: Terphenyl-d14	*19.5*		*"*	*25.0*		*77.9*	*30.7-106*				
LCS Dup (BC60190-BSD1) LCS Dup							Prepared & Analyzed: 03/04/2026				
1,1-Biphenyl	13.1	5.00	ug/L	25.0		52.2	33-95		18.2	20	
1,2,4,5-Tetrachlorobenzene	12.2	5.00	"	25.0		48.9	26-120		16.5	20	
1,2-Diphenylhydrazine (as Azobenzene)	13.6	5.00	"	25.0		54.4	16-141		21.4	20	Non-dir.
2,3,4,6-Tetrachlorophenol	15.7	5.00	"	25.0		63.0	30-130		19.5	20	
2,4,5-Trichlorophenol	15.6	5.00	"	25.0		62.2	32-114		12.7	20	
2,4,6-Trichlorophenol	14.3	5.00	"	25.0		57.2	35-118		11.9	20	
2,4-Dichlorophenol	14.4	5.00	"	25.0		57.7	25-116		13.5	20	
2,4-Dimethylphenol	15.1	5.00	"	25.0		60.2	15-116		13.6	20	
2,4-Dinitrophenol	22.5	5.00	"	25.0		89.9	10-170		9.53	20	
2,4-Dinitrotoluene	16.4	5.00	"	25.0		65.4	41-128		11.7	20	
2,6-Dinitrotoluene	15.2	5.00	"	25.0		60.8	45-116		16.7	20	
2-Chloronaphthalene	12.7	5.00	"	25.0		50.8	33-112		15.3	20	
2-Chlorophenol	11.4	5.00	"	25.0		45.4	15-120		15.7	20	
2-Methylnaphthalene	11.8	5.00	"	25.0		47.1	24-118		17.2	20	
2-Methylphenol	10.8	5.00	"	25.0		43.3	10-110		10.5	20	
2-Nitroaniline	15.2	5.00	"	25.0		60.7	34-129		17.4	20	
2-Nitrophenol	12.6	5.00	"	25.0		50.6	28-118		16.1	20	
3- & 4-Methylphenols	8.40	5.00	"	25.0		33.6	10-107		14.4	20	
3,3-Dichlorobenzidine	9.20	5.00	"	25.0		36.8	15-187		29.3	20	Non-dir.
3-Nitroaniline	11.2	5.00	"	25.0		45.0	24-134		17.8	20	
4,6-Dinitro-2-methylphenol	19.0	5.00	"	25.0		76.1	10-153		9.85	20	
4-Bromophenyl phenyl ether	14.6	5.00	"	25.0		58.5	34-120		11.5	20	
4-Chloro-3-methylphenol	15.0	5.00	"	25.0		60.0	20-120		17.0	20	
4-Chloroaniline	11.0	5.00	"	25.0		43.8	10-147		12.0	20	
4-Chlorophenyl phenyl ether	14.5	5.00	"	25.0		57.9	27-121		14.2	20	
4-Nitroaniline	14.3	5.00	"	25.0		57.0	13-134		13.7	20	
4-Nitrophenol	5.03	5.00	"	25.0		20.1	10-131		16.4	20	
Acetophenone	12.7	5.00	"	25.0		50.9	25-110		17.7	20	
Aniline	7.51	5.00	"	25.0		30.0	10-117		22.9	20	Non-dir.
Benzaldehyde	13.4	5.00	"	25.0		53.7	29-117		15.9	20	
Benzoic acid	3.21	5.00	"	25.0		12.8	30-130	Low Bias	26.5	20	Non-dir.
Benzyl alcohol	9.16	5.00	"	25.0		36.6	10-117		13.6	20	
Benzyl butyl phthalate	18.6	5.00	"	25.0		74.6	29-133		10.1	20	

Semivolatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BC60190 - EPA 3510C											
LCS Dup (BC60190-BSD1) LCS Dup								Prepared & Analyzed: 03/04/2026			
Bis(2-chloroethoxy)methane	13.8	5.00	ug/L	25.0		55.1	10-154		14.6	20	
Bis(2-chloroethyl)ether	11.6	5.00	"	25.0		46.3	17-125		19.1	20	
Bis(2-chloroisopropyl)ether	11.0	5.00	"	25.0		43.9	10-139		22.7	20	Non-dir.
Caprolactam	14.4	5.00	"	25.0		57.5	10-137		18.7	20	
Carbazole	17.4	5.00	"	25.0		69.5	42-126		7.69	20	
Dibenzofuran	14.1	5.00	"	25.0		56.4	36-113		17.5	20	
Diethyl phthalate	15.7	5.00	"	25.0		62.7	38-115		16.1	20	
Dimethyl phthalate	15.0	5.00	"	25.0		60.2	38-129		19.7	20	
Di-n-butyl phthalate	17.2	5.00	"	25.0		68.8	31-120		10.6	20	
Di-n-octyl phthalate	18.6	5.00	"	25.0		74.2	21-149		9.99	20	
Diphenylamine	17.5	5.00	"	25.0		69.8	40-140		13.8	20	
Hexachlorocyclopentadiene	9.14	10.0	"	25.0		36.6	10-130		23.1	20	Non-dir.
Isophorone	13.9	5.00	"	25.0		55.7	25-127		22.0	20	Non-dir.
N-nitroso-di-n-propylamine	12.3	5.00	"	25.0		49.0	26-122		22.4	20	Non-dir.
N-Nitrosodiphenylamine	17.4	5.00	"	25.0		69.4	23-149		14.4	20	
Phenol	4.24	5.00	"	25.0		17.0	10-110		15.0	20	
Pyridine	3.85	5.00	"	35.0		11.0	10-90		27.4	20	Non-dir.
Surrogate: SURR: 2-Fluorophenol	*13.5*		*"*	*50.0*		*26.9*	*19.7-63.1*				
Surrogate: SURR: Phenol-d6	*8.20*		*"*	*50.0*		*16.4*	*10.1-41.7*				
Surrogate: SURR: Nitrobenzene-d5	*12.2*		*"*	*25.0*		*48.7*	*50.2-113*				
Surrogate: SURR: 2-Fluorobiphenyl	*13.3*		*"*	*25.0*		*53.1*	*39.9-105*				
Surrogate: SURR: 2,4,6-Tribromophenol	*31.4*		*"*	*50.0*		*62.8*	*39.3-151*				
Surrogate: SURR: Terphenyl-d14	*19.0*		*"*	*25.0*		*76.0*	*30.7-106*				
Batch BC60269 - EPA 3510C											
Blank (BC60269-BLK1) Blank								Prepared & Analyzed: 03/05/2026			
1,1-Biphenyl	ND	5.00	ug/L								
1,2,4,5-Tetrachlorobenzene	ND	5.00	"								
1,2-Diphenylhydrazine (as Azobenzene)	ND	5.00	"								
2,3,4,6-Tetrachlorophenol	ND	5.00	"								
2,4,5-Trichlorophenol	ND	5.00	"								
2,4,6-Trichlorophenol	ND	5.00	"								
2,4-Dichlorophenol	ND	5.00	"								
2,4-Dimethylphenol	ND	5.00	"								
2,4-Dinitrophenol	ND	5.00	"								
2,4-Dinitrotoluene	ND	5.00	"								
2,6-Dinitrotoluene	ND	5.00	"								
2-Chloronaphthalene	ND	5.00	"								
2-Chlorophenol	ND	5.00	"								
2-Methylnaphthalene	ND	5.00	"								
2-Methylphenol	ND	5.00	"								
2-Nitroaniline	ND	5.00	"								
2-Nitrophenol	ND	5.00	"								
3- & 4-Methylphenols	ND	5.00	"								
3,3-Dichlorobenzidine	ND	5.00	"								
3-Nitroaniline	ND	5.00	"								
4,6-Dinitro-2-methylphenol	ND	5.00	"								
4-Bromophenyl phenyl ether	ND	5.00	"								
4-Chloro-3-methylphenol	ND	5.00	"								
4-Chloroaniline	ND	5.00	"								

Semivolatile Organic Compounds by GC/MS - Quality Control Data

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Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BC60269 - EPA 3510C											
Blank (BC60269-BLK1) Blank								Prepared & Analyzed: 03/05/2026			
4-Chlorophenyl phenyl ether	ND	5.00	ug/L								
4-Nitroaniline	ND	5.00	"								
4-Nitrophenol	ND	5.00	"								
Acetophenone	ND	5.00	"								
Aniline	ND	5.00	"								
Benzaldehyde	ND	5.00	"								
Benzidine	ND	5.00	"								
Benzoic acid	ND	5.00	"								
Benzyl alcohol	ND	5.00	"								
Benzyl butyl phthalate	ND	5.00	"								
Bis(2-chloroethoxy)methane	ND	5.00	"								
Bis(2-chloroethyl)ether	ND	5.00	"								
Bis(2-chloroisopropyl)ether	ND	5.00	"								
Caprolactam	ND	5.00	"								
Carbazole	ND	5.00	"								
Dibenzofuran	ND	5.00	"								
Diethyl phthalate	ND	5.00	"								
Dimethyl phthalate	ND	5.00	"								
Di-n-butyl phthalate	ND	5.00	"								
Di-n-octyl phthalate	ND	5.00	"								
Diphenylamine	ND	5.00	"								
Hexachlorocyclopentadiene	ND	10.0	"								
Isophorone	ND	5.00	"								
N-nitroso-di-n-propylamine	ND	5.00	"								
N-Nitrosodiphenylamine	ND	5.00	"								
Phenol	ND	5.00	"								
Pyridine	ND	5.00	"								
Surrogate: SURR: 2-Fluorophenol	*12.6*		*"*	*50.0*		*25.1*	*19.7-63.1*				
Surrogate: SURR: Phenol-d6	*6.72*		*"*	*50.0*		*13.4*	*10.1-41.7*				
Surrogate: SURR: Nitrobenzene-d5	*12.6*		*"*	*25.0*		*50.6*	*50.2-113*				
Surrogate: SURR: 2-Fluorobiphenyl	*12.9*		*"*	*25.0*		*51.7*	*39.9-105*				
Surrogate: SURR: 2,4,6-Tribromophenol	*26.5*		*"*	*50.0*		*52.9*	*39.3-151*				
Surrogate: SURR: Terphenyl-d14	*17.1*		*"*	*25.0*		*68.3*	*30.7-106*				

Semivolatile Organic Compounds by GC/MS - Quality Control Data

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Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BC60269 - EPA 3510C											
LCS (BC60269-BS1) LCS							Prepared & Analyzed: 03/05/2026				
1,1-Biphenyl	14.5	5.00	ug/L	25.0		57.9	33-95				
1,2,4,5-Tetrachlorobenzene	13.8	5.00	"	25.0		55.3	26-120				
1,2-Diphenylhydrazine (as Azobenzene)	14.4	5.00	"	25.0		57.6	16-141				
2,3,4,6-Tetrachlorophenol	16.2	5.00	"	25.0		64.6	30-130				
2,4,5-Trichlorophenol	16.3	5.00	"	25.0		65.2	32-114				
2,4,6-Trichlorophenol	15.3	5.00	"	25.0		61.1	35-118				
2,4-Dichlorophenol	15.7	5.00	"	25.0		62.7	25-116				
2,4-Dimethylphenol	16.6	5.00	"	25.0		66.5	15-116				
2,4-Dinitrophenol	20.4	5.00	"	25.0		81.7	10-170				
2,4-Dinitrotoluene	16.7	5.00	"	25.0		66.9	41-128				
2,6-Dinitrotoluene	16.5	5.00	"	25.0		66.0	45-116				
2-Chloronaphthalene	13.9	5.00	"	25.0		55.7	33-112				
2-Chlorophenol	12.8	5.00	"	25.0		51.4	15-120				
2-Methylnaphthalene	13.5	5.00	"	25.0		54.0	24-118				
2-Methylphenol	11.8	5.00	"	25.0		47.1	10-110				
2-Nitroaniline	16.1	5.00	"	25.0		64.5	34-129				
2-Nitrophenol	14.1	5.00	"	25.0		56.3	28-118				
3- & 4-Methylphenols	9.37	5.00	"	25.0		37.5	10-107				
3,3-Dichlorobenzidine	11.6	5.00	"	25.0		46.2	15-187				
3-Nitroaniline	12.2	5.00	"	25.0		48.9	24-134				
4,6-Dinitro-2-methylphenol	17.9	5.00	"	25.0		71.6	10-153				
4-Bromophenyl phenyl ether	14.4	5.00	"	25.0		57.7	34-120				
4-Chloro-3-methylphenol	16.0	5.00	"	25.0		63.9	20-120				
4-Chloroaniline	12.0	5.00	"	25.0		48.0	10-147				
4-Chlorophenyl phenyl ether	15.2	5.00	"	25.0		60.8	27-121				
4-Nitroaniline	14.4	5.00	"	25.0		57.8	13-134				
4-Nitrophenol	ND	5.00	"	25.0			10-131	Low Bias			
Acetophenone	15.0	5.00	"	25.0		60.0	25-110				
Aniline	8.87	5.00	"	25.0		35.5	10-117				
Benzaldehyde	15.4	5.00	"	25.0		61.7	29-117				
Benzoic acid	ND	5.00	"	25.0			30-130	Low Bias			
Benzyl alcohol	9.83	5.00	"	25.0		39.3	10-117				
Benzyl butyl phthalate	18.0	5.00	"	25.0		71.9	29-133				
Bis(2-chloroethoxy)methane	15.6	5.00	"	25.0		62.3	10-154				
Bis(2-chloroethyl)ether	13.4	5.00	"	25.0		53.5	17-125				
Bis(2-chloroisopropyl)ether	13.3	5.00	"	25.0		53.4	10-139				
Caprolactam	14.8	5.00	"	25.0		59.1	10-137				
Carbazole	16.3	5.00	"	25.0		65.3	42-126				
Dibenzofuran	15.1	5.00	"	25.0		60.4	36-113				
Diethyl phthalate	16.3	5.00	"	25.0		65.2	38-115				
Dimethyl phthalate	16.1	5.00	"	25.0		64.4	38-129				
Di-n-butyl phthalate	17.0	5.00	"	25.0		68.0	31-120				
Di-n-octyl phthalate	17.5	5.00	"	25.0		70.2	21-149				
Diphenylamine	17.9	5.00	"	25.0		71.6	40-140				
Hexachlorocyclopentadiene	11.1	10.0	"	25.0		44.6	10-130				
Isophorone	16.0	5.00	"	25.0		64.1	25-127				
N-nitroso-di-n-propylamine	14.7	5.00	"	25.0		58.8	26-122				
N-Nitrosodiphenylamine	17.7	5.00	"	25.0		70.8	23-149				
Phenol	4.73	5.00	"	25.0		18.9	10-110				
Pyridine	4.63	5.00	"	35.0		13.2	10-90				

Semivolatile Organic Compounds by GC/MS - Quality Control Data

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Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BC60269 - EPA 3510C											
LCS (BC60269-BS1) LCS							Prepared & Analyzed: 03/05/2026				
Surrogate: SURR: 2-Fluorophenol	*13.4*		*ug/L*	*50.0*		*26.8*	*19.7-63.1*				
Surrogate: SURR: Phenol-d6	*8.08*		*"*	*50.0*		*16.2*	*10.1-41.7*				
Surrogate: SURR: Nitrobenzene-d5	*12.7*		*"*	*25.0*		*50.6*	*50.2-113*				
Surrogate: SURR: 2-Fluorobiphenyl	*13.4*		*"*	*25.0*		*53.5*	*39.9-105*				
Surrogate: SURR: 2,4,6-Tribromophenol	*27.6*		*"*	*50.0*		*55.1*	*39.3-151*				
Surrogate: SURR: Terphenyl-d14	*16.5*		*"*	*25.0*		*66.2*	*30.7-106*				
LCS Dup (BC60269-BSD1) LCS Dup							Prepared & Analyzed: 03/05/2026				
1,1-Biphenyl	11.9	5.00	ug/L	25.0		47.6	33-95		19.6	20	
1,2,4,5-Tetrachlorobenzene	11.6	5.00	"	25.0		46.2	26-120		18.0	20	
1,2-Diphenylhydrazine (as Azobenzene)	11.3	5.00	"	25.0		45.2	16-141		24.1	20	Non-dir.
2,3,4,6-Tetrachlorophenol	12.9	5.00	"	25.0		51.8	30-130		22.1	20	Non-dir.
2,4,5-Trichlorophenol	13.1	5.00	"	25.0		52.4	32-114		21.8	20	Non-dir.
2,4,6-Trichlorophenol	12.6	5.00	"	25.0		50.4	35-118		19.2	20	
2,4-Dichlorophenol	12.6	5.00	"	25.0		50.3	25-116		21.9	20	Non-dir.
2,4-Dimethylphenol	13.7	5.00	"	25.0		54.8	15-116		19.3	20	
2,4-Dinitrophenol	17.2	5.00	"	25.0		68.8	10-170		17.2	20	
2,4-Dinitrotoluene	13.3	5.00	"	25.0		53.1	41-128		23.1	20	Non-dir.
2,6-Dinitrotoluene	13.1	5.00	"	25.0		52.3	45-116		23.2	20	Non-dir.
2-Chloronaphthalene	11.6	5.00	"	25.0		46.3	33-112		18.4	20	
2-Chlorophenol	11.0	5.00	"	25.0		43.9	15-120		15.7	20	
2-Methylnaphthalene	11.3	5.00	"	25.0		45.3	24-118		17.6	20	
2-Methylphenol	9.77	5.00	"	25.0		39.1	10-110		18.7	20	
2-Nitroaniline	13.1	5.00	"	25.0		52.4	34-129		20.7	20	Non-dir.
2-Nitrophenol	12.2	5.00	"	25.0		48.7	28-118		14.5	20	
3- & 4-Methylphenols	7.67	5.00	"	25.0		30.7	10-107		20.0	20	
3,3-Dichlorobenzidine	9.12	5.00	"	25.0		36.5	15-187		23.6	20	Non-dir.
3-Nitroaniline	10.4	5.00	"	25.0		41.4	24-134		16.6	20	
4,6-Dinitro-2-methylphenol	14.5	5.00	"	25.0		57.9	10-153		21.2	20	Non-dir.
4-Bromophenyl phenyl ether	11.8	5.00	"	25.0		47.4	34-120		19.6	20	
4-Chloro-3-methylphenol	13.1	5.00	"	25.0		52.5	20-120		19.5	20	
4-Chloroaniline	10.1	5.00	"	25.0		40.5	10-147		17.1	20	
4-Chlorophenyl phenyl ether	12.1	5.00	"	25.0		48.3	27-121		22.8	20	Non-dir.
4-Nitroaniline	11.9	5.00	"	25.0		47.6	13-134		19.4	20	
4-Nitrophenol	ND	5.00	"	25.0			10-131	Low Bias		20	
Acetophenone	12.2	5.00	"	25.0		48.9	25-110		20.4	20	Non-dir.
Aniline	5.72	5.00	"	25.0		22.9	10-117		43.2	20	Non-dir.
Benzaldehyde	12.8	5.00	"	25.0		51.4	29-117		18.2	20	
Benzoic acid	3.59	5.00	"	25.0		14.4	30-130	Low Bias	56.4	20	Non-dir.
Benzyl alcohol	8.15	5.00	"	25.0		32.6	10-117		18.7	20	
Benzyl butyl phthalate	13.9	5.00	"	25.0		55.5	29-133		25.7	20	Non-dir.
Bis(2-chloroethoxy)methane	12.5	5.00	"	25.0		50.0	10-154		21.9	20	Non-dir.
Bis(2-chloroethyl)ether	11.2	5.00	"	25.0		45.0	17-125		17.4	20	
Bis(2-chloroisopropyl)ether	10.8	5.00	"	25.0		43.2	10-139		21.0	20	Non-dir.
Caprolactam	11.7	5.00	"	25.0		46.7	10-137		23.4	20	Non-dir.
Carbazole	13.3	5.00	"	25.0		53.3	42-126		20.2	20	Non-dir.
Dibenzofuran	12.2	5.00	"	25.0		48.9	36-113		21.1	20	Non-dir.
Diethyl phthalate	13.0	5.00	"	25.0		52.0	38-115		22.5	20	Non-dir.
Dimethyl phthalate	12.9	5.00	"	25.0		51.6	38-129		22.1	20	Non-dir.
Di-n-butyl phthalate	13.5	5.00	"	25.0		54.1	31-120		22.9	20	Non-dir.

Semivolatile Organic Compounds by GC/MS - Quality Control Data

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Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BC60269 - EPA 3510C											
LCS Dup (BC60269-BSD1) LCS Dup								Prepared & Analyzed: 03/05/2026			
Di-n-octyl phthalate	13.8	5.00	ug/L	25.0		55.0	21-149		24.2	20	Non-dir.
Diphenylamine	14.3	5.00	"	25.0		57.1	40-140		22.5	20	Non-dir.
Hexachlorocyclopentadiene	9.50	10.0	"	25.0		38.0	10-130		15.9	20	
Isophorone	12.7	5.00	"	25.0		50.6	25-127		23.5	20	Non-dir.
N-nitroso-di-n-propylamine	11.7	5.00	"	25.0		46.7	26-122		23.0	20	Non-dir.
N-Nitrosodiphenylamine	14.2	5.00	"	25.0		56.6	23-149		22.2	20	Non-dir.
Phenol	3.86	5.00	"	25.0		15.4	10-110		20.3	20	Non-dir.
Pyridine	ND	5.00	"	35.0			10-90	Low Bias		20	
Surrogate: SURR: 2-Fluorophenol	*11.1*		*"*	*50.0*		*22.2*	*19.7-63.1*				
Surrogate: SURR: Phenol-d6	*6.88*		*"*	*50.0*		*13.8*	*10.1-41.7*				
Surrogate: SURR: Nitrobenzene-d5	*10.4*		*"*	*25.0*		*41.6*	*50.2-113*				
Surrogate: SURR: 2-Fluorobiphenyl	*10.6*		*"*	*25.0*		*42.3*	*39.9-105*				
Surrogate: SURR: 2,4,6-Tribromophenol	*22.3*		*"*	*50.0*		*44.6*	*39.3-151*				
Surrogate: SURR: Terphenyl-d14	*12.6*		*"*	*25.0*		*50.4*	*30.7-106*				

Semivolatile Organic Compounds by GC/MS/SIM - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BC60270 - EPA 3510C											
Blank (BC60270-BLK2) Blank								Prepared & Analyzed: 03/05/2026			
Acenaphthene	ND	0.0500	ug/L								
Acenaphthylene	ND	0.0500	"								
Anthracene	ND	0.0500	"								
Atrazine	ND	0.500	"								
Benzo(a)anthracene	ND	0.0500	"								
Benzo(a)pyrene	ND	0.0500	"								
Benzo(b)fluoranthene	ND	0.0500	"								
Benzo(g,h,i)perylene	ND	0.0500	"								
Benzo(k)fluoranthene	ND	0.0500	"								
Bis(2-ethylhexyl)phthalate	ND	0.500	"								
Chrysene	ND	0.0500	"								
Dibenzo(a,h)anthracene	ND	0.0500	"								
Fluoranthene	ND	0.0500	"								
Fluorene	ND	0.0500	"								
Hexachlorobenzene	ND	0.0200	"								
Hexachlorobutadiene	ND	0.500	"								
Hexachloroethane	ND	0.500	"								
Indeno(1,2,3-cd)pyrene	ND	0.0500	"								
Naphthalene	ND	0.0500	"								
Nitrobenzene	ND	0.250	"								
N-Nitrosodimethylamine	ND	0.500	"								
Pentachlorophenol	ND	0.250	"								
Phenanthrene	ND	0.0500	"								
Pyrene	ND	0.0500	"								
LCS (BC60270-BS2) LCS								Prepared: 03/05/2026 Analyzed: 03/06/2026			
Acenaphthene	0.484	0.0500	ug/L	1.00		48.4	25-116				
Acenaphthylene	0.492	0.0500	"	1.00		49.2	26-116				
Anthracene	0.551	0.0500	"	1.00		55.1	25-123				
Benzo(a)anthracene	0.596	0.0500	"	1.00		59.6	33-125				
Benzo(a)pyrene	0.579	0.0500	"	1.00		57.9	32-132				
Benzo(b)fluoranthene	0.606	0.0500	"	1.00		60.6	22-137				
Benzo(g,h,i)perylene	0.634	0.0500	"	1.00		63.4	10-138				
Benzo(k)fluoranthene	0.619	0.0500	"	1.00		61.9	20-137				
Bis(2-ethylhexyl)phthalate	0.715	0.500	"	1.00		71.5	10-189				
Chrysene	0.639	0.0500	"	1.00		63.9	32-124				
Dibenzo(a,h)anthracene	0.618	0.0500	"	1.00		61.8	16-133				
Fluoranthene	0.599	0.0500	"	1.00		59.9	32-121				
Fluorene	0.529	0.0500	"	1.00		52.9	28-118				
Hexachlorobenzene	0.593	0.0200	"	1.00		59.3	23-124				
Hexachlorobutadiene	ND	0.500	"	1.00			15-123	Low Bias			
Hexachloroethane	1.83	0.500	"	1.00		183	18-115	High Bias			
Indeno(1,2,3-cd)pyrene	0.602	0.0500	"	1.00		60.2	15-135				
Naphthalene	0.435	0.0500	"	1.00		43.5	18-120				
Nitrobenzene	0.257	0.250	"	1.00		25.7	21-121				
N-Nitrosodimethylamine	ND	0.500	"	1.00			10-124	Low Bias			
Pentachlorophenol	0.317	0.250	"	1.00		31.7	10-156				
Phenanthrene	0.602	0.0500	"	1.00		60.2	24-127				
Pyrene	0.600	0.0500	"	1.00		60.0	31-132				

Wet Chemistry Parameters - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BC60283 - Analysis Preparation											
Blank (BC60283-BLK1) Blank									Prepared: 03/05/2026 Analyzed: 03/09/2026		
Total Organic Carbon (TOC)	ND	1.00	mg/L								
LCS (BC60283-BS1) LCS									Prepared: 03/05/2026 Analyzed: 03/09/2026		
Total Organic Carbon (TOC)	48.4	1.00	mg/L	50.0		96.9	79.5-125.1				

Miscellaneous Physical Parameters - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BC60161 - % Solids Prep											
Blank (BC60161-BLK1) Blank									Prepared & Analyzed: 03/04/2026		
% Solids	ND	0.100	%								
Duplicate (BC60161-DUP1) Duplicate	*Source sample: 26C0140-12 (TS-01-S-E6)								Prepared & Analyzed: 03/04/2026		
% Solids	78.7	0.100	%		70.2				11.5	20	

Volatile Analysis Sample Containers

Lab ID	Client Sample ID	Volatile Sample Container
26C0140-01	TS-01-GW-E1	40mL Clear Vial (pre-pres.) HCl; Cool to 4° C
26C0140-02	TS-01-GW-E2	40mL Clear Vial (pre-pres.) HCl; Cool to 4° C
26C0140-03	TS-01-GW-E3	40mL Clear Vial (pre-pres.) HCl; Cool to 4° C
26C0140-04	TS-01-GW-E4	40mL Clear Vial (pre-pres.) HCl; Cool to 4° C
26C0140-05	TS-01-GW-E5	40mL Clear Vial (pre-pres.) HCl; Cool to 4° C
26C0140-06	TS-01-GW-E6	40mL Clear Vial (pre-pres.) HCl; Cool to 4° C
26C0140-07	TS-01-S-E1	40mL Vial with Stir Bar-Cool 4° C
26C0140-08	TS-01-S-E2	40mL Vial with Stir Bar-Cool 4° C
26C0140-09	TS-01-S-E3	40mL Vial with Stir Bar-Cool 4° C
26C0140-10	TS-01-S-E4	40mL Vial with Stir Bar-Cool 4° C
26C0140-11	TS-01-S-E5	40mL Vial with Stir Bar-Cool 4° C
26C0140-12	TS-01-S-E6	40mL Vial with Stir Bar-Cool 4° C

Sample and Data Qualifiers Relating to This Work Order

S-08	The recovery of this surrogate was outside of QC limits.
QL-02	This LCS analyte is outside Laboratory Recovery limits due the analyte behavior using the referenced method. The reference method has certain limitations with respect to analytes of this nature.
J	Detected below the Reporting Limit but greater than or equal to the Method Detection Limit (MDL/LOD) or in the case of a TIC, the result is an estimated concentration.
IS-LO	The internal std associated with this target compound did not meet acceptance criteria (area <50% CCV) at the stated dilution due to matrix effects. Sample was rerun to confirm matrix effects.
IS-HI	The internal std associated with this target compound did not meet acceptance criteria (area >200% CCV) at the stated dilution due to matrix effects. Sample was rerun to confirm matrix effects.
IS-08	Recovery of this internal standard was outside QC limits.
IS-01	This internal standard did not meet acceptance criteria. The sample was reanalyzed to confirm matrix interference. The associated compounds have been flagged IS-HI or IS-LO accordingly.
ICVE	The value reported is ESTIMATED. The value is estimated due to its behavior during initial calibration verification (recovery exceeded 30% of expected value).
EXT-EM	The sample exhibited emulsion formation during the extraction process. This may affect surrogate recoveries.
CCVE	The value reported is ESTIMATED. The value is estimated due to its behavior during continuing calibration verification (>20% Difference for average Rf or >20% Drift for quadratic fit).
CAL-E	The value reported is ESTIMATED. The value is estimated due to its behavior during initial calibration (average Rf>20%)
B	Analyte is found in the associated analysis batch blank. For volatiles, methylene chloride and acetone are common lab contaminants.
/\	Analyte is not certified but the state of sample origination offer certification for the Analyte

Definitions and Other Explanations

*	Analyte is not certified or the state of the samples origination does not offer certification for the Analyte.
ND	NOT DETECTED - the analyte is not detected at the Reported to level (LOQ/RL or LOD/MDL)
RL	REPORTING LIMIT - the minimum reportable value based upon the lowest point in the analyte calibration curve.
LOQ	LIMIT OF QUANTITATION - the minimum concentration of a target analyte that can be reported within a specified degree of confidence. This is the lowest point in an analyte calibration curve that has been subjected to all steps of the processing/analysis and verified to meet defined criteria. This is based upon NELAC 2009 Standards and applies to all analyses.
LOD	LIMIT OF DETECTION - a verified estimate of the minimum concentration of a substance in a given matrix that an analytical process can reliably detect. This is based upon NELAC 2009 Standards and applies to all analyses conducted under the auspices of EPA SW-846.
MDL	METHOD DETECTION LIMIT - a statistically derived estimate of the minimum amount of a substance an analytical system can reliably detect with a 99% confidence that the concentration of the substance is greater than zero. This is based upon 40 CFR Part 136 Appendix B and applies only to EPA 600 and 200 series methods.
Reported to	This indicates that the data for a particular analysis is reported to either the LOD/MDL, or the LOQ/RL. In cases where the "Reported to" is located above the LOD/MDL, any value between this and the LOQ represents an estimated value which is "J" flagged accordingly. This applies to volatile and semi-volatile target compounds only.
NR	Not reported
RPD	Relative Percent Difference
Wet	The data has been reported on an as-received (wet weight) basis
Low Bias	Low Bias flag indicates that the recovery of the flagged analyte is below the laboratory or regulatory lower control limit. The data user should take note that this analyte may be biased low but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.

High Bias — High Bias flag indicates that the recovery of the flagged analyte is above the laboratory or regulatory upper control limit. The data user should take note that this analyte may be biased high but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.

Non-Dir. — Non-dir. flag (Non-Directional Bias) indicates that the Relative Percent Difference (RPD) (a measure of precision) among the MS and MSD data is outside the laboratory or regulatory control limit. This alerts the data user where the MS and MSD are from site-specific samples that the RPD is high due to either non-homogeneous distribution of target analyte between the MS/MSD or indicates poor reproducibility for other reasons.

If EPA SW-846 method 8270 is included herein it is noted that the target compound N-nitrosodiphenylamine (NDPA) decomposes in the gas chromatographic inlet and cannot be separated from diphenylamine (DPA). These results could actually represent 100% DPA, 100% NDPA or some combination of the two. For this reason, ALS reports the combined result for n-nitrosodiphenylamine and diphenylamine for either of these compounds as a combined concentration as Diphenylamine.

If Total PCBs are detected and the target aroclors reported are "Not detected", the Total PCB value is reported due to the presence of either or both Aroclors 1262 and 1268 which are non-target aroclors for some regulatory lists.

2-chloroethylvinyl ether readily breaks down under acidic conditions. Samples that are acid preserved, including standards will exhibit breakdown. The data user should take note.

Certification for pH is no longer offered by NYDOH ELAP.

Semi-Volatile and Volatile analyses are reported down to the LOD/MDL, with values between the LOD/MDL and the LOQ being "J" flagged as estimated results.

For analyses by EPA SW-846-8270D, the Limit of Quantitation (LOQ) reported for benzidine is based upon the lowest standard used for calibration and is not a verified LOQ due to this compound's propensity for oxidative losses during extraction/concentration procedures and non-reproducible chromatographic performance.

Field Chain-of-Custody Record

ALS Project Number: 26C0140

ALS' Standard Terms & Conditions are listed on the back side of this document. This legal document serves as your written authorization for ALS to proceed with the analyses requested below. Your signature binds you to ALS' Standard Terms & Conditions.

120 Research Drive Stratford, CT 06615 | 132-02 89th Ave Queens, NY 11418 | 56 Church Hill Rd. #2 Newtown, CT 06470 | 2161 Whitesville Rd Toms River, NJ 08755 | clientservices@yorklab.com | 800-306-YORK | 800-306-9675

Report To:
Company: LANGAN
Address: 368 9th Ave, 8th Fl, NY-NY 10001
Phone.: 212-479-3400
Contact: Amita Oka
E-mail: aoka@langan.com

Invoice To:
Company: Same
Address: Same
Phone.:
Contact:
E-mail:

YOUR Project Name / Number: Willets L. Parcel 170197605

PO Number:

Samples Collected From: NY / CT / NJ / PA / Other: (please specify)

Turn-Around Time: RUSH - Next Day; RUSH - Two Day; RUSH - Three Day; RUSH - Four Day; RUSH - Five Day; Standard (6-9 Day) ✓; PFAS Standard 7-10 Day

Please print clearly and legibly. All information must be complete. Samples will not be logged in and the turn-around-time clock will not begin until any questions by ALS are resolved.

Chantel Abou-Khalil

Samples Collected by: (print AND sign your name)

Matrix Codes: S - soil/solid/sludge; GW - groundwater; DW - drinking water; SW - surface water; WW - wastewater; O - Oil; Other

Preservative (please list number of containers)

Sample Identification	Date	Time	Matrix	Unpreserved	HCl (hydrochloric acid)	MeOH (methanol)	HNO_3 (nitric acid)	H_2SO_4 (sulfuric acid)	NaOH (sodium hydroxide)	$Na_2S_2O_3$ (sodium thio.)	Trizma	Ammonium Acetate	Other:	TCL VOCs	SVOCs	TOC	Grab or Comp. G/C
TS-01-E1	3/3/26	12:30	Grab											X	X	X	
TS-01-E2		12:45															
TS-01-E3		13:00															
TS-01-E4		13:15															
TS-01-E5		13:30															
TS-01-E6		13:45															

Report Type (circle): QA Report; Summary (Results Only); NY ASP B Package; NJ Reduced; NJ DKQP; NJ Full; CT RCP

EDD Type (circle): EQuIS (standard); NYSDEC EQuIS; NJDEP SRP Haz Site; Standard Excel; CMDP; Other:

Regulatory Comparative: Compared to the following Regulation(s): (please fill in)

Field Filtered; Lab Filtered

Comments: Please cc: aoka@langan.com, pkrishnaswamy@langan.com; caboukhalil@langan.com

Samples iced/chilled at time of lab pickup? circle Yes or No

Lab Sample Receiving Checklist (to be completed by the receiving laboratory only) Circle Y / N

Custody Seals: Y / N Containers Intact: Y / N COC/Labels Agree: Y / N Preservation Confirmed: Y / N
COC Complete: Y / N COC Received: Y / N Appropriate Sample Volumes: Y / N Appropriate Sample Containers: Y / N
Cooler Temperature Confirmed: Y / N Samples Submitted within Holding Times: Y / N Corrective Action Form Required: Y / N

Samples Relinquished by / Company	Date/Time	Samples Received by / Company	Date/Time	Samples Relinquished by / Company	Date/Time
Chantel / Langan	3/3/26 15:54	1. Mark	3/3/26 1555	2. Mark	3.3.26 18:10
3. Samples Received by / Company	Date/Time	3. Samples Relinquished by / Company	Date/Time	3. Samples Received by / Company	Date/Time
MAC	3.3.26 18:10	MAC	3.3.26	[illegible]	3/3/26 19:46
Samples Relinquished by / Company	Date/Time	4. Samples Received by / Company	Date/Time	Samples Received in LAB by	Date/Time / Thermometer ID / Temperature
[illegible]	3/3/26 21:11			Fourlah W	3/3/26 21:11 / 6.0 Degrees C

Field Chain-of-Custody Record

ALS' Standard Terms & Conditions are listed on the back side of this document. This legal document serves as your written authorization for ALS to proceed with the analyses requested below. Your signature binds you to ALS' Standard Terms & Conditions.

ALS Project Number: 26C0140

120 Research Drive Stratford, CT 06615 132-02 89th Ave Queens, NY 11418 56 Church Hill Rd. #2 Newtown, CT 06470 2161 Whitesville Rd Toms River, NJ 08755 clientservices@yorklab.com 800-306-YORK 800-306-9675

Report To:
Company: LANGAN
Address: 368 9th Ave, 8th Fl, NY-NY 10001
Phone.: 212-479-3400
Contact: Anuta Oka
E-mail: aOka@langan.com

Invoice To:
Company: same
Address: same
Phone.:
Contact:
E-mail:

YOUR Project Name / Number: Willets L. Parcel 170197605

PO Number:

Samples Collected From: NY ✓ | CT | NJ | PA | Other: (please specify)

Turn-Around Time: Standard (6-9 Day) ✓

Please print clearly and legibly. All information must be complete. Samples will not be logged in and the turn-around-time clock will not begin until any questions by ALS are resolved.

Chahd Abou-khalil

Samples Collected by: (print AND sign your name)

Matrix Codes: S - soil/solid/sludge; GW - groundwater; DW - drinking water; SW - surface water; WW - wastewater; O - Oil; Other

Preservative (please list number of containers)

Analyses Requested

Sample Identification	Date	Time	Matrix	Unpreserved	HCl (hydrochloric acid)	MeOH (methanol)	HNO_3 (nitric acid)	H_2SO_4 (sulfuric acid)	NaOH (sodium hydroxide)	$Na_2S_2O_3$ (sodium thio.)	Trizma	Ammonium Acetate	Other:	TCL VOCs	SVOCs	TOC	Grab or Comp.
TS-01-E1	3/3/26	14:00	S											x	x	x	G/C
TS-02-E2		14:15															
TS-03-E3		14:30															
TS-04-E4		14:45															
TS-05-E5		15:00															
TS-06-E6		15:15															

Report Type (circle): QA Report; Summary (Results Only); NY ASP B Package; NJ Reduced; NJ DKQP; NJ Full; CT RCP

EDD Type (circle): EQuIS (standard); NYSDEC EQuIS; NJDEP SRP Haz Site; Standard Excel; CMDP; Other:

Regulatory Comparative: Compared to the following Regulation(s): (please fill in)

Field Filtered
Lab Filtered

Comments: Please C.C: adka@langan.com; caboukhalil@langan.com; PKrishnamany@langan.com

Samples iced/chilled at time of lab pickup? circle Yes or No

Lab Sample Receiving Checklist (to be completed by the receiving laboratory only) Circle Y / N

Custody Seals: Y / N Containers Intact: Y / N COC/Labels Agree: Y / N Preservation Confirmed: Y / N
COC Complete: Y / N COC Received: Y / N Appropriate Sample Volumes: Y / N Appropriate Sample Containers: Y / N
Cooler Temperature Confirmed: Y / N Samples Submitted within Holding Times: Y / N Corrective Action Form Required: Y / N

Samples Relinquished by / Company	Date/Time	Samples Received by / Company	Date/Time	Samples Relinquished by / Company	Date/Time
Chahd Langan	3/3/26 15:54	1.	3/3/26 1555	2.	3.3.26 18:10
1.	3.3.26 18:10	2.		3.	3/3/26 19:46
2.	3/3/26 21:11	3.	3.3.26	4.	
3.		4.		Samples Received in LAB by.	Date/Time 3/3/26 21:11

Thermometer ID: Temperature 5.0 Degrees C

March 12, 2026 Service Request No:R2602950

ALS Environmental - Stratford
120 Research Drive
Stratford, CT 06615

Laboratory Results for: 26C0140

Dear Reporting-Strafford,

Enclosed are the results of the sample(s) submitted to our laboratory March 05, 2026
For your reference, these analyses have been assigned our service request number **R2602950.**

All testing was performed according to our laboratory's quality assurance program and met the requirements of the TNI standards except as noted in the case narrative report. Any testing not included in the lab's accreditation is identified on a Non-Certified Analytes report. All results are intended to be considered in their entirety. ALS Environmental is not responsible for use of less than the complete report. Results apply only to the individual samples submitted to the lab for analysis, as listed in the report. The measurement uncertainty of the results included in this report is within that expected when using the prescribed method(s), and represented by Laboratory Control Sample control limits. Any events, such as QC failures or Holding Time exceedances, which may add to the uncertainty are explained in the report narrative or are flagged with qualifiers. The flags are explained in the Report Qualifiers and Definitions page of this report.

Please contact me if you have any questions. My extension is 7475. You may also contact me via email at Meghan.Pedro@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Meghan Pedro
Project Manager

ADDRESS 1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
PHONE +1 585 288 5380 | FAX +1 585 288 8475
ALS Group USA, Corp.
dba ALS Environmental

Narrative Documents

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

Client: ALS Environmental - (Formerly York)
Project: 26C0140
Sample Matrix: Soil

Service Request: R2602950
Date Received: 03/05/2026

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier II level requested by the client.

Sample Receipt:

Six soil samples were received for analysis at ALS Environmental on 03/05/2026. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The samples were stored at minimum in accordance with the analytical method requirements.

General Chemistry:

No significant anomalies were noted with this analysis.

Approved by _____ Date 03/12/2026

SAMPLE DETECTION SUMMARY

This form includes only detections above the reporting levels. For a full listing of sample results, continue to the Sample Results section of this Report.

CLIENT ID: 26C0140-07			Lab ID: R2602950-001			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Carbon, Total Organic (TOC)	39300		3400	3400	mg/Kg	EPA LKahn 7-27-1988

CLIENT ID: 26C0140-08			Lab ID: R2602950-002			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Carbon, Total Organic (TOC)	42700		3300	3300	mg/Kg	EPA LKahn 7-27-1988

CLIENT ID: 26C0140-09			Lab ID: R2602950-003			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Carbon, Total Organic (TOC)	32200		2900	2900	mg/Kg	EPA LKahn 7-27-1988

CLIENT ID: 26C0140-10			Lab ID: R2602950-004			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Carbon, Total Organic (TOC)	29900		2400	2400	mg/Kg	EPA LKahn 7-27-1988

CLIENT ID: 26C0140-11			Lab ID: R2602950-005			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Carbon, Total Organic (TOC)	23600		2800	2800	mg/Kg	EPA LKahn 7-27-1988

CLIENT ID: 26C0140-12			Lab ID: R2602950-006			
Analyte	**Results**	**Flag**	**MDL**	**MRL**	**Units**	**Method**
Carbon, Total Organic (TOC)	41300		2400	2400	mg/Kg	EPA LKahn 7-27-1988

Sample Receipt Information

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
R2602950-001	26C0140-07	3/3/2026	1600
R2602950-002	26C0140-08	3/3/2026	1415
R2602950-003	26C0140-09	3/3/2026	1430
R2602950-004	26C0140-10	3/3/2026	1445
R2602950-005	26C0140-11	3/3/2026	1500
R2602950-006	26C0140-12	3/3/2026	1515

3/3/2026

SUBCONTRACT Notification, Purchase Order and Chain-of-Custody

Project No.: 26C0140

This information is being sent to inform you that ALS-Stratford intends to subcontract certain samples to another licensed laboratory for specific parameters that we cannot perform in-house. The specific paramters that will be subcontracted are detailed below. Do not contact the subcontract laboratory directly. Please contact your project manager for further information.

E-mail lab reports to: USAEnviro.Stratford@alsglobal.com Sample confirmations to: NASTR.Subcontract@alsglobal.com
Mail Hard Copies to: The address below

SENDING LABORATORY:

ALS Environmental - Stratford
120 Research Dr
Stratford, CT 06615
Phone: 203.325.1371

RECEIVING LABORATORY:

ALS-Rochester
1565 W Jefferson Rd Suite 360,
Rochester, NY 14623
Phone :(000) 000-0000

Sample ID: TS_01_E1 ALS Ref: 26C0140-07

Matrix: Soil Date Sampled : 03/03/2026 16:00

Analysis Needed	Date Due	Holding Time Expires	Comments
Total Organic Carbon (TOC-SUB)	03/11/2026 19:00	03/17/2026 16:00	

Containers Supplied:
06_4 oz. Glass Cool to 4° C (E)

Sample ID: TS_01_E2 ALS Ref: 26C0140-08

Matrix: Soil Date Sampled : 03/03/2026 14:15

Analysis Needed	Date Due	Holding Time Expires	Comments
Total Organic Carbon (TOC-SUB)	03/11/2026 19:00	03/17/2026 14:15	

Containers Supplied:
06_4 oz. Glass Cool to 4° C (E)

Purchase Order No.: 26C0140

Samples from State of: NY
Collected by: Client

Deliverables required:

EDDs required:

Data Pkg DUE:
Special Info:
Reporting level: MDL

R2602950 5
ALS Environmental - Stratford
26C0140

Chain-of-Custody Information

Released By ALS-Stratford Sample Control	Date	Received By	Date
Carolina Fernandez	3/3/2026	Chris C 3.4.26	6:15 p.m.
Chris C 3.4.26		Mark Oikle	3/4/26

Received By	Date	Received in Subcontract Lab By	Date
Rec. ALS Hamilton 3-5-26 1212		[illegible]	3/5/26 12:12

3/3/2026

SUBCONTRACT Notification, Purchase Order and Chain-of-Custody

Project No.: 26C0140

This information is being sent to inform you that ALS-Stratford intends to subcontract certain samples to another licensed laboratory for specific parameters that we cannot perform in-house. The specific paramters that will be subcontracted are detailed below. Do not contact the subcontract laboratory directly. Please contact your project manager for further information.

E-mail lab reports to: USAEnviro.Stratford@alsglobal.com **Sample confirmations to:** NASTR.Subcontract@alsglobal.com
Mail Hard Copies to: The address below

Sample ID: TS_01_E3 **ALS Ref: 26C0140-09**

Matrix: Soil **Date Sampled :** 03/03/2026 14:30

Analysis Needed	Date Due	Holding Time Expires	Comments
Total Organic Carbon (TOC-SUB)	03/11/2026 19:00	03/17/2026 14:30	

Containers Supplied:
06_4 oz. Glass Cool to 4° C (E)

Sample ID: TS_01_E4 **ALS Ref: 26C0140-10**

Matrix: Soil **Date Sampled :** 03/03/2026 14:45

Analysis Needed	Date Due	Holding Time Expires	Comments
Total Organic Carbon (TOC-SUB)	03/11/2026 19:00	03/17/2026 14:45	

Containers Supplied:
06_4 oz. Glass Cool to 4° C (E)

Sample ID: TS_01_E5 **ALS Ref: 26C0140-11**

Matrix: Soil **Date Sampled :** 03/03/2026 15:00

Analysis Needed	Date Due	Holding Time Expires	Comments
Total Organic Carbon (TOC-SUB)	03/11/2026 19:00	03/17/2026 15:00	

Containers Supplied:
06_4 oz. Glass Cool to 4° C (E)

Purchase Order No.: 26C0140

Samples from State of: NY
Collected by: Client

Deliverables required:

EDDs required:

Data Pkg DUE:
Special Info:
Reporting level: MDL/LOD

Chain-of-Custody Information

Carolina Fernandez	3/3/2026	Chai. C 3-4-26	
Released By ALS-Stratford Sample Control	Date	Received By	Date
Chai. C 3-4-26		Mark O'Kuhn	3/4/26
~~Received By~~	Date	Received in Subcontract Lab By	Date
O Hamilton	3-5-26 1212	3/5/26 RM 1212	

3/3/2026

SUBCONTRACT Notification, Purchase Order and Chain-of-Custody

Project No.: 26C0140

This information is being sent to inform you that ALS-Stratford intends to subcontract certain samples to another licensed laboratory for specific parameters that we cannot perform in-house. The specific paramters that will be subcontracted are detailed below. Do not contact the subcontract laboratory directly. Please contact your project manager for further information.

E-mail lab reports to: USAEnviro.Stratford@alsglobal.com **Sample confirmations to:** NASTR.Subcontract@alsglobal.com
Mail Hard Copies to: The address below

Sample ID: TS_01_E6 **ALS Ref: 26C0140-12**

Matrix: Soil **Date Sampled :** 03/03/2026 15:15

Analysis Needed	Date Due	Holding Time Expires	Comments
Total Organic Carbon (TOC-SUB)	03/11/2026 19:00	03/17/2026 15:15	

Containers Supplied:
06_4 oz. Glass Cool to 4° C (E)

Purchase Order No.: 26C0140

Samples from State of: NY
Collected by: Client

Deliverables required:

EDDs required:

Data Pkg DUE:
Special Info:
Reporting level: MDL/LOD

Chain-of-Custody Information

Carolina Fernandez	3/3/2026	Chris C 3-4-26	6:45 Am
Released By ALS-Stratford Sample Control	Date	Received By	Date
Chris C 3-4-26		Mark O'Hara	3/4/26
Received By	Date	Received in Subcontract Lab By	Date
R.J. McLean - ALS O Hamilton 3-5-26 1212		315126 12:12	

R2602950 5
ALS Environmental - Stratford
26C0140

Cooler Receipt and Preservation Check Form

Project/Client ALS-York Folder Number

Cooler received on 03/05/26 by: ce

COURIER: (ALS) UPS FEDEX PDQ USPS CLIENT

1	Were **Custody seals** on outside of cooler?	Y (N)
2	**Custody papers** properly completed (ink, signed)?	(Y) N
3	Did all bottles arrive in good **condition** (unbroken)?	(Y) N
4	Circle: (**Wet Ice**) **Dry Ice** **Gel packs** present?	(Y) N

5a	Did **VOA** vials have sig* **bubbles**?	Y (N) NA
5b	Sig* bubbles: **Alk?** Y (N) NA **Sulfide?**	Y (N) NA
6	Where did the bottles originate? ALS/ROC	(CLIENT)
7	Soil VOA received as: Bulk Encore 5035set	(NA)

8. Temperature Readings Date: 03/05/26 Time: 1227 ID: IR#11 (IR#12) IR#13 From: Temp Blank (Sample Bottle)

Temp (°C)	5.7	0.9	7.5	1.5	1.7	2.2	
Within 0-6°C?	(Y) N	(Y) N	Y (N)	(Y) N	(Y) N	(Y) N	Y N
If <0°C, were samples frozen?	Y N	Y N	Y N	Y N	Y N	Y N	Y N

If out of Temperature, note packing/ice condition: _____ Ice melted Poorly Packed (described below) (Same Day Rule)

&Client Approval to Run Samples: _____ Standing Approval Client aware at drop-off Client notified by: _____

All samples held in storage location: SMO by ce on 03/05/26 at 1249
5035 samples placed in storage location: _____ by _____ on _____ at _____ within 48 hours of sampling? Y N

Cooler Breakdown/Preservation Check**: Date: 3/5/26 Time: 1804 by: IT

9. Were all bottle labels complete (*i.e.* analysis, preservation, etc.)? (YES) NO
10. Did all bottle labels and tags agree with custody papers? (YES) NO
11. Were correct containers used for the tests indicated? (YES) NO
12. Were 5035 vials acceptable (no extra labels, not leaking)? YES NO (N/A)
13. Were dissolved metals filtered in the field? YES NO (N/A)

pH	Lot of test paper	Reagent	Preserved? Yes	Preserved? No	Lot Received	Exp	Sample ID Adjusted	Vol. Added	Lot Added	Final pH
≥12		NaOH								
≤2		HNO_3								
≤2		H_2SO_4								
<4		$NaHSO_4$								
5-9		For 608pest			No=Notify for 3day					
Residual Chlorine (-)		For CN, Phenol, 625, 608pest, 522			If +, contact PM to add $Na_2S_2O_3$ (625, 608, CN), ascorbic (phenol).					
		$Na_2S_2O_3$								
		ZnAcetate	-	-						
		HCl	**	**						

**VOAs and 1664 Not to be tested before analysis. Otherwise, all bottles of all samples with chemical preservatives are checked (not just representatives).

Bottle lot numbers: Label covered

Explain all Discrepancies/ Other Comments:

HPROD	BULK
HTR	FLDT
SUB	HGFB
ALS	LL3541

Labels secondary reviewed by: IT

*significant air bubbles: VOA > 5-6 mm : WC >1 in. diameter

eQMS Rev 23 2/10/2026 VSC

Miscellaneous Forms

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

REPORT QUALIFIERS AND DEFINITIONS

U	Analyte was analyzed for but not detected. The sample quantitation limit has been corrected for dilution and for percent moisture, unless otherwise noted in the case narrative.
J	Estimated value due to either being a Tentatively Identified Compound (TIC) or that the concentration is between the MRL and the MDL. Concentrations are not verified within the linear range of the calibration. For DoD: concentration >40% difference between two GC columns (pesticides/Arclors).
B	Analyte was also detected in the associated method blank at a concentration that may have contributed to the sample result.
E	Inorganics- Concentration is estimated due to the serial dilution was outside control limits.
E	Organics- Concentration has exceeded the calibration range for that specific analysis.
D	Concentration is a result of a dilution, typically a secondary analysis of the sample due to exceeding the calibration range or that a surrogate has been diluted out of the sample and cannot be assessed.
*	Indicates that a quality control parameter has exceeded laboratory limits. Under the "Notes" column of the Form I, this qualifier denotes analysis was performed out of Holding Time.
H	Analysis was performed out of hold time for tests that have an "immediate" hold time criteria.
#	Spike was diluted out.
+	Correlation coefficient for MSA is <0.995.
N	Inorganics- Matrix spike recovery was outside laboratory limits.
N	Organics- Presumptive evidence of a compound (reported as a TIC) based on the MS library search.
S	Concentration has been determined using Method of Standard Additions (MSA).
W	Post-Digestion Spike recovery is outside control limits and the sample absorbance is <50% of the spike absorbance.
P	Concentration >40% difference between the two GC columns.
C	Confirmed by GC/MS
Q	DoD reports: indicates a pesticide/Aroclor is not confirmed (≥100% Difference between two GC columns).
X	See Case Narrative for discussion.
MRL LOQ	Method Reporting Limit. Also known as: Limit of Quantitation (LOQ) The lowest concentration at which the method analyte may be reliably quantified under the method conditions.
MDL	Method Detection Limit. A statistical value derived from a study designed to provide the lowest concentration that will be detected 99% of the time. Values between the MDL and MRL are estimated (see J qualifier).
LOD	Limit of Detection. A value at or above the MDL which has been verified to be detectable.
ND	Non-Detect. Analyte was not detected at the concentration listed. Same as U qualifier.

Rochester Lab ID # for State Accreditations[1]

NELAP States
Florida ID # E87674
New Hampshire ID # 2941
New York ID # 10145
Pennsylvania ID# 68-786
Texas ID#T104704581
Virginia #460167

Non-NELAP States
Connecticut ID #PH0556
Delaware Approved
Maine ID #NY01587
North Carolina #36701
North Carolina #676
Rhode Island LAO00333

[1] Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state or agency requirements. The test results meet requirements of the current NELAP/TNI standards or state or agency requirements, where applicable, except as noted in the case narrative. Since not all analyte/method/matrix combinations are offered for state/NELAC accreditation, this report may contain results which are not accredited. For a specific list of accredited analytes, contact the laboratory. To verify NH accredited analytes, go to https://www4.des.state.nh.us/CertifiedLabs/Certified-Method.aspx.

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Client: ALS Environmental - (Formerly York) **Service Request:** R2602950
Project: 26C0140/

Sample Name: 26C0140-07 **Date Collected:** 03/3/26
Lab Code: R2602950-001 **Date Received:** 03/5/26
Sample Matrix: Soil

Analysis Method	Extracted/Digested By	Analyzed By
EPA LKahn 7-27-1988		SBIRNBERG

Sample Name: 26C0140-08 **Date Collected:** 03/3/26
Lab Code: R2602950-002 **Date Received:** 03/5/26
Sample Matrix: Soil

Analysis Method	Extracted/Digested By	Analyzed By
EPA LKahn 7-27-1988		SBIRNBERG

Sample Name: 26C0140-09 **Date Collected:** 03/3/26
Lab Code: R2602950-003 **Date Received:** 03/5/26
Sample Matrix: Soil

Analysis Method	Extracted/Digested By	Analyzed By
EPA LKahn 7-27-1988		SBIRNBERG

Sample Name: 26C0140-10 **Date Collected:** 03/3/26
Lab Code: R2602950-004 **Date Received:** 03/5/26
Sample Matrix: Soil

Analysis Method	Extracted/Digested By	Analyzed By
EPA LKahn 7-27-1988		SBIRNBERG

Sample Name: 26C0140-11 **Date Collected:** 03/3/26
Lab Code: R2602950-005 **Date Received:** 03/5/26
Sample Matrix: Soil

Analysis Method	Extracted/Digested By	Analyzed By
EPA LKahn 7-27-1988		SBIRNBERG

Analyst Summary report

Client:	ALS Environmental - (Formerly York)	**Service Request:**	R2602950
Project:	26C0140/		

Sample Name:	26C0140-12	**Date Collected:**	03/3/26
Lab Code:	R2602950-006	**Date Received:**	03/5/26
Sample Matrix:	Soil		

Analysis Method	Extracted/Digested By	Analyzed By
EPA LKahn 7-27-1988		SBIRNBERG

The preparation methods associated with this report are found in these tables unless discussed in the case narrative.

INORGANIC

Water/Liquid Matrix

Analytical Method	Preparation Method
200.7 / 200.8	200.2
6010D	3005A/3010A
6020B	ILM05.3
9034 Sulfide Acid Soluble	9030B
SM 4500-CN-N-2016 Amenable and Residual Cyanide	SM 4500-CN-G and SM 4500-CN-B,C-2016
SM 4500-CN-E WAD Cyanide	SM 4500-CN-I

Solid/Soil/Non-Aqueous Matrix

Analytical Method	Preparation Method
6010D	3050B
6010D TCLP (1311) extract	3005A/3010A
6010D SPLP (1312) extract	3005A/3010A
7199	3060A
300.0 Anions/ 350.1/ 353.2/ SM 2320B/ SM 5210B/ 9056A Anions	DI extraction
For analytical methods not listed, the preparation method is the same as the analytical method reference.	

ORGANIC

Preparation Methods for Organic methods are listed in the header of the Results pages.

Regarding "Bulk/5035A":
For soil/solid samples submitted in soil jars for Volatiles analysis, the prep method is listed as "Bulk/5035A". The lab follows the closed-system EPA 5035A protocols once the sample is transferred to a sealed vial, but collection in bulk in soil jars does not follow the collection protocols listed in EPA 5035A. In accordance with the NYSDOH technical notice of October 2012, all results or reporting limits <200 ug/kg are to be considered estimated due to potential low bias.

Sample Results

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

General Chemistry

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

Analytical Report

Client:	ALS Environmental - (Formerly York)	**Service Request:**	R2602950
Project:	26C0140	**Date Collected:**	03/03/26 16:00
Sample Matrix:	Soil	**Date Received:**	03/05/26 12:12
Sample Name:	26C0140-07	**Basis:**	Dry, per Method
Lab Code:	R2602950-001		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Carbon, Total Organic (TOC)	EPA LKahn 7-27-1988	**39300**	mg/Kg	3400	3400	1	03/10/26 11:28	

Analytical Report

Client:	ALS Environmental - (Formerly York)	**Service Request:**	R2602950
Project:	26C0140	**Date Collected:**	03/03/26 14:15
Sample Matrix:	Soil	**Date Received:**	03/05/26 12:12
Sample Name:	26C0140-08	**Basis:**	Dry, per Method
Lab Code:	R2602950-002		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Carbon, Total Organic (TOC)	EPA LKahn 7-27-1988	**42700**	mg/Kg	3300	3300	1	03/10/26 11:40	

Analytical Report

Client:	ALS Environmental - (Formerly York)	**Service Request:**	R2602950
Project:	26C0140	**Date Collected:**	03/03/26 14:30
Sample Matrix:	Soil	**Date Received:**	03/05/26 12:12
Sample Name:	26C0140-09	**Basis:**	Dry, per Method
Lab Code:	R2602950-003		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Carbon, Total Organic (TOC)	EPA LKahn 7-27-1988	**32200**	mg/Kg	2900	2900	1	03/10/26 11:45	

Analytical Report

Client:	ALS Environmental - (Formerly York)	**Service Request:**	R2602950
Project:	26C0140	**Date Collected:**	03/03/26 14:45
Sample Matrix:	Soil	**Date Received:**	03/05/26 12:12
Sample Name:	26C0140-10	**Basis:**	Dry, per Method
Lab Code:	R2602950-004		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Carbon, Total Organic (TOC)	EPA LKahn 7-27-1988	**29900**	mg/Kg	2400	2400	1	03/10/26 11:50	

Analytical Report

Client:	ALS Environmental - (Formerly York)	**Service Request:**	R2602950
Project:	26C0140	**Date Collected:**	03/03/26 15:00
Sample Matrix:	Soil	**Date Received:**	03/05/26 12:12
Sample Name:	26C0140-11	**Basis:**	Dry, per Method
Lab Code:	R2602950-005		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Carbon, Total Organic (TOC)	EPA LKahn 7-27-1988	**23600**	mg/Kg	2800	2800	1	03/10/26 11:55	

Analytical Report

Client:	ALS Environmental - (Formerly York)	**Service Request:**	R2602950
Project:	26C0140	**Date Collected:**	03/03/26 15:15
Sample Matrix:	Soil	**Date Received:**	03/05/26 12:12
Sample Name:	26C0140-12	**Basis:**	Dry, per Method
Lab Code:	R2602950-006		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Carbon, Total Organic (TOC)	EPA LKahn 7-27-1988	**41300**	mg/Kg	2400	2400	1	03/10/26 12:04	

QC Summary Forms

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

General Chemistry

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

Analytical Report

Client:	ALS Environmental - (Formerly York)	**Service Request:**	R2602950
Project:	26C0140	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
Sample Name:	Method Blank	**Basis:**	Dry, per Method
Lab Code:	R2602950-MB		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Carbon, Total Organic (TOC)	EPA LKahn 7-27-1988	ND U	mg/Kg	300	300	1	03/10/26 11:11	

Client:	ALS Environmental - (Formerly York)	**Service Request:**	R2602950
Project:	26C0140	**Date Collected:**	03/03/26
Sample Matrix:	Soil	**Date Received:**	03/05/26
		Date Analyzed:	03/10/26

Matrix Spike Summary
Carbon, Total Organic (TOC)

Sample Name:	26C0140-12	**Units:**	mg/Kg
Lab Code:	R2602950-006	**Basis:**	Dry, per Method
Analysis Method:	EPA LKahn 7-27-1988		

Matrix Spike
R2602950-006MS

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Carbon, Total Organic (TOC)	41300	51000	18500	52	27-162

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Matrix Spike and Matrix Spike Duplicate Data is presented for information purposes only. The matrix may or may not be relevant to samples reported in this report. The laboratory evaluates system performance based on the LCS and LCSD control limits.

Client:	ALS Environmental - (Formerly York)	**Service Request:**	R2602950
Project	26C0140	**Date Collected:**	03/03/26
Sample Matrix:	Soil	**Date Received:**	03/05/26
		Date Analyzed:	03/10/26

Replicate Sample Summary
General Chemistry Parameters

Sample Name:	26C0140-12	**Units:**	mg/Kg
Lab Code:	R2602950-006	**Basis:**	Dry, per Method

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample R2602950-006DUP Result	Average	RPD	RPD Limit
Carbon, Total Organic (TOC)	EPA LKahn 7-27-1988	2400	2400	41300	36500	38900	12	30

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Client: ALS Environmental **-** (Formerly York)
Project: 26C0140
Sample Matrix: Soil

Service Request: R2602950
Date Analyzed: 03/10/26

Lab Control Sample Summary
General Chemistry Parameters

Units:mg/Kg
Basis: Dry, per Method

Lab Control Sample
R2602950**-**LCS

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Carbon, Total Organic (TOC)	EPA LKahn 7**-**27**-**1988	1900	2000	95	75**-**127

QA/QC Report

Client:	ALS Environmental - (Formerly York)	**Service Request:**	R2602950
Project	26C0140	**Date Collected:**	03/03/26
Sample Matrix:	Soil	**Date Received:**	03/05/26
		Date Analyzed:	03/10/26

Triplicate Sample Summary
General Chemistry Parameters

Sample Name:	26C0140-12	**Units:**	mg/Kg
Lab Code:	R2602950-006	**Basis:**	Dry, per Method
Analysis Method:	EPA LKahn 7-27-1988		

Analyte Name	MRL	MDL	Sample Result	Duplicate R2602950-006DUP Result	Triplicate R2602950-006TRP Result	Average	RSD	RSD Limit
Carbon, Total Organic (TOC)	2500	2500	41300	36500	36700	38100	7	30

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Printed 3/12/2026 9:47:50 AM

SuperSet Reference:26-0000764136 rev 00

QA/QC Report

Client:	ALS Environmental - (Formerly York)	**Service Request:**	R2602950
Project	26C0140	**Date Collected:**	03/03/26
Sample Matrix:	Soil	**Date Received:**	03/05/26
		Date Analyzed:	03/10/26

Quadruplicate Sample Summary
General Chemistry Parameters

Sample Name:	26C0140-12	**Units:**	mg/Kg
Lab Code:	R2602950-006	**Basis:**	Dry, per Method
Analysis Method:	EPA LKahn 7-27-1988		

Analyte Name	MRL	MDL	Sample Result	Duplicate R2602950-006DUP Result	Triplicate R2602950-006TRP Result	Quadruplicate R2602950-006QUAD Result	Average	RSD	RSD Limit
Carbon, Total Organic (TOC)	2200	2200	41300	36500	36700	31000	36400	12	30.8

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Printed 3/12/2026 9:47:49 AM

SuperSet Reference:26-0000764136 rev 00

Technical Report

prepared for:

Langan Engineering & Environmental Services (NYC)
21 Penn Plaza, 360 West 31st Street
New York NY, 10001
Attention: Amita Oka

Report Date: 02/18/2026
Client Project ID: 170197605
Project (SDG) No.: 26B0750

Report Date: 02/18/2026
Client Project ID: 170197605
Project (SDG) No.: 26B0750

Langan Engineering & Environmental Services (NYC)
21 Penn Plaza, 360 West 31st Street
New York NY, 10001
Attention: Amita Oka

Purpose and Results

This report contains the analytical data for the sample(s) identified on the attached chain-of-custody received in our laboratory on February 17, 2026 and listed below. The project was identified as your project: **170197605**.

The analyses were conducted utilizing appropriate EPA, Standard Methods, and ASTM methods as detailed in the data summary tables.

All samples were received in proper condition meeting the customary acceptance requirements for environmental samples except those indicated under the Sample and Analysis Qualifiers section of this report.

All analyses met the method and laboratory standard operating procedure requirements except as indicated by any data flags, the meaning of which are explained in the Sample and Data Qualifiers Relating to This Work Order section of this report and case narrative if applicable.

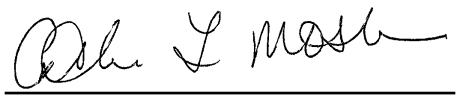
The results of the analyses, which are all reported on dry weight basis (soils) unless otherwise noted, are detailed in the following pages.

Please contact Client Services at 203.325.1371 with any questions regarding this report.

Sample ID	Client Sample ID	Matrix	Date Collected	Date Received
26B0750-01	TS-01-C1	Ground Water	02/17/2026	02/17/2026

General Notes for Project (SDG) No.: 26B0750

1. The RLs and MDLs (Reporting Limit and Method Detection Limit respectively) reported are adjusted for any dilution necessary due to the levels of target and/or non-target analytes and matrix interference. The RL(REPORTING LIMIT) is based upon the lowest standard utilized for the calibration where applicable.
2. Samples are retained for a period of thirty days after submittal of report, unless other arrangements are made.
3. ALS' liability for the above data is limited to the dollar value paid to ALS for the referenced project.
4. This report shall not be reproduced without the written approval of ALS, Inc.
5. All analyses conducted met method or Laboratory SOP requirements. See the Sample and Data Qualifiers Section for further information.
6. It is noted that no analyses reported herein were subcontracted to another laboratory, unless noted in the report.
7. This report reflects results that relate only to the samples submitted on the attached chain-of-custody form(s) received by ALS.
8. Analyses conducted at ALS, Inc. Stratford, CT are indicated by NY Cert. No. 10854; those conducted at ALS, Inc., Richmond Hill, NY are indicated by NY Cert. No. 12058.

Approved By: 

Cassie Mosher
Laboratory Manager - Stratford

Date: 02/18/2026

Sample Information

Client Sample ID: TS-01-C1 **Sample ID:** 26B0750-01

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26B0750	170197605	Ground Water	February 17, 2026 3:00 pm	02/17/2026

VOA, 8260 LOW MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND		ug/L	0.216	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-55-6	1,1,1-Trichloroethane	ND		ug/L	0.266	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-34-5	1,1,2,2-Tetrachloroethane	ND		ug/L	0.256	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		ug/L	0.286	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-00-5	1,1,2-Trichloroethane	ND		ug/L	0.249	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-34-3	1,1-Dichloroethane	ND		ug/L	0.272	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-35-4	1,1-Dichloroethylene	ND		ug/L	0.327	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-61-6	1,2,3-Trichlorobenzene	ND		ug/L	0.222	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
96-18-4	1,2,3-Trichloropropane	ND		ug/L	0.273	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
120-82-1	1,2,4-Trichlorobenzene	ND		ug/L	0.138	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
95-63-6	**1,2,4-Trimethylbenzene**	**198**		ug/L	3.10	5.00	10	EPA 8260D	02/18/2026 09:40	02/18/2026 11:13	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
96-12-8	1,2-Dibromo-3-chloropropane	ND		ug/L	0.432	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-93-4	1,2-Dibromoethane	ND		ug/L	0.215	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-50-1	1,2-Dichlorobenzene	ND		ug/L	0.270	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-06-2	1,2-Dichloroethane	ND		ug/L	0.377	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-87-5	1,2-Dichloropropane	ND		ug/L	0.327	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-67-8	**1,3,5-Trimethylbenzene**	**63.1**		ug/L	0.347	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
541-73-1	1,3-Dichlorobenzene	ND		ug/L	0.283	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-46-7	1,4-Dichlorobenzene	ND		ug/L	0.311	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-93-3	**2-Butanone**	**11.2**		ug/L	0.421	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: TS-01-C1 **Sample ID:** 26B0750-01

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26B0750	170197605	Ground Water	February 17, 2026 3:00 pm	02/17/2026

VOA, 8260 LOW MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
591-78-6	**2-Hexanone**	**2.03**		ug/L	0.320	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-10-1	**4-Methyl-2-pentanone**	**10.8**		ug/L	0.365	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-64-1	**Acetone**	**108**	CCVE	ug/L	13.4	20.0	10	EPA 8260D	02/18/2026 09:40	02/18/2026 11:13	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-02-8	Acrolein	ND	ICVE	ug/L	0.447	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-13-1	Acrylonitrile	ND		ug/L	0.422	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-43-2	**Benzene**	**34.8**		ug/L	0.279	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-97-5	Bromochloromethane	ND		ug/L	0.354	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
75-27-4	Bromodichloromethane	ND		ug/L	0.245	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-25-2	Bromoform	ND		ug/L	0.163	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-83-9	Bromomethane	ND	CCVE	ug/L	0.500	2.00	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-15-0	**Carbon disulfide**	**0.970**		ug/L	0.362	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
56-23-5	Carbon tetrachloride	ND		ug/L	0.204	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-90-7	Chlorobenzene	ND		ug/L	0.284	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-00-3	Chloroethane	ND		ug/L	0.448	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-66-3	**Chloroform**	**0.260**		ug/L	0.243	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-87-3	Chloromethane	ND	CCVE, ICVE	ug/L	0.372	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-59-2	cis-1,2-Dichloroethylene	ND		ug/L	0.294	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-01-5	cis-1,3-Dichloropropylene	ND		ug/L	0.262	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
110-82-7	**Cyclohexane**	**1.96**	CCVE	ug/L	0.491	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
124-48-1	Dibromochloromethane	ND		ug/L	0.146	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-95-3	Dibromomethane	ND		ug/L	0.203	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		

Sample Information

Client Sample ID: TS-01-C1 **Sample ID:** 26B0750-01

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26B0750	170197605	Ground Water	February 17, 2026 3:00 pm	02/17/2026

VOA, 8260 LOW MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-71-8	Dichlorodifluoromethane	ND	ICVE	ug/L	0.451	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
100-41-4	**Ethyl Benzene**	**29.9**		ug/L	0.290	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-68-3	Hexachlorobutadiene	ND		ug/L	0.241	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	NYSDOH-NY12058,PADEP-68-04440		
98-82-8	**Isopropylbenzene**	**7.07**		ug/L	0.405	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-20-9	Methyl acetate	ND		ug/L	0.442	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
1634-04-4	**Methyl tert-butyl ether (MTBE)**	**294**	ICVE, QL-02	ug/L	2.44	5.00	10	EPA 8260D	02/18/2026 09:40	02/18/2026 11:13	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-87-2	**Methylcyclohexane**	**1.61**	CCVE	ug/L	0.477	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
75-09-2	**Methylene chloride**	**34.4**		ug/L	0.397	2.00	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
104-51-8	n-Butylbenzene	ND		ug/L	0.399	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
103-65-1	**n-Propylbenzene**	**16.0**		ug/L	0.384	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-47-6	**o-Xylene**	**87.8**		ug/L	2.61	5.00	10	EPA 8260D	02/18/2026 09:40	02/18/2026 11:13	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
179601-23-1	**p- & m- Xylenes**	**117**		ug/L	5.78	10.0	10	EPA 8260D	02/18/2026 09:40	02/18/2026 11:13	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
99-87-6	**p-Isopropyltoluene**	**1.69**		ug/L	0.377	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
135-98-8	**sec-Butylbenzene**	**2.20**		ug/L	0.444	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
100-42-5	Styrene	ND		ug/L	0.255	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-65-0	**tert-Butyl alcohol (TBA)**	**1790**		ug/L	6.08	10.0	10	EPA 8260D	02/18/2026 09:40	02/18/2026 11:13	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
98-06-6	tert-Butylbenzene	ND		ug/L	0.367	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
127-18-4	Tetrachloroethylene	ND	QL-02	ug/L	0.239	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-88-3	**Toluene**	**75.9**		ug/L	3.46	5.00	10	EPA 8260D	02/18/2026 09:40	02/18/2026 11:13	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-60-5	trans-1,2-Dichloroethylene	ND		ug/L	0.279	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-02-6	trans-1,3-Dichloropropylene	ND		ug/L	0.229	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: TS-01-C1 **Sample ID:** 26B0750-01

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26B0750	170197605	Ground Water	February 17, 2026 3:00 pm	02/17/2026

VOA, 8260 LOW MASTER

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
79-01-6	Trichloroethylene	ND		ug/L	0.249	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-69-4	Trichlorofluoromethane	ND		ug/L	0.337	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-01-4	Vinyl Chloride	ND		ug/L	0.469	0.500	1	EPA 8260D	02/17/2026 20:00	02/17/2026 21:14	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
1330-20-7	**Xylenes, Total**	**205**		ug/L	8.39	15.0	10	EPA 8260D	02/18/2026 09:40	02/18/2026 11:13	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: SURR: 1,2-Dichloroethane-d4*	*101 %*	*69-130*
2037-26-5	*Surrogate: SURR: Toluene-d8*	*98.0 %*	*81-117*
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*101 %*	*79-122*

Analytical Batch Summary

Batch ID: BB60939 **Preparation Method:** EPA 5030B **Prepared By:** me

Sample ID	Client Sample ID	Preparation Date
26B0750-01	TS-01-C1	02/17/26
BB60939-BLK1	Blank	02/17/26
BB60939-BS1	LCS	02/17/26
BB60939-BSD1	LCS Dup	02/17/26

Batch ID: BB60984 **Preparation Method:** EPA 5030B **Prepared By:** THD

Sample ID	Client Sample ID	Preparation Date
26B0750-01RE1	TS-01-C1	02/18/26
BB60984-BLK1	Blank	02/18/26
BB60984-BS1	LCS	02/18/26
BB60984-BSD1	LCS Dup	02/18/26

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60939 - EPA 5030B											
Blank (BB60939-BLK1) Blank									Prepared & Analyzed: 02/17/2026		
1,1,1,2-Tetrachloroethane	ND	0.500	ug/L								
1,1,1-Trichloroethane	ND	0.500	"								
1,1,2,2-Tetrachloroethane	ND	0.500	"								
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.500	"								
1,1,2-Trichloroethane	ND	0.500	"								
1,1-Dichloroethane	ND	0.500	"								
1,1-Dichloroethylene	ND	0.500	"								
1,2,3-Trichlorobenzene	0.850	0.500	"								
1,2,3-Trichloropropane	ND	0.500	"								
1,2,4-Trichlorobenzene	0.500	0.500	"								
1,2,4-Trimethylbenzene	ND	0.500	"								
1,2-Dibromo-3-chloropropane	ND	0.500	"								
1,2-Dibromoethane	ND	0.500	"								
1,2-Dichlorobenzene	ND	0.500	"								
1,2-Dichloroethane	ND	0.500	"								
1,2-Dichloropropane	ND	0.500	"								
1,3,5-Trimethylbenzene	ND	0.500	"								
1,3-Dichlorobenzene	ND	0.500	"								
1,4-Dichlorobenzene	ND	0.500	"								
2-Butanone	ND	0.500	"								
2-Hexanone	ND	0.500	"								
4-Methyl-2-pentanone	ND	0.500	"								
Acetone	ND	2.00	"								
Acrolein	ND	0.500	"								
Acrylonitrile	ND	0.500	"								
Benzene	ND	0.500	"								
Bromochloromethane	ND	0.500	"								
Bromodichloromethane	ND	0.500	"								
Bromoform	ND	0.500	"								
Bromomethane	ND	2.00	"								
Carbon disulfide	ND	0.500	"								
Carbon tetrachloride	ND	0.500	"								
Chlorobenzene	ND	0.500	"								
Chloroethane	ND	0.500	"								
Chloroform	ND	0.500	"								
Chloromethane	ND	0.500	"								
cis-1,2-Dichloroethylene	ND	0.500	"								
cis-1,3-Dichloropropylene	ND	0.500	"								
Cyclohexane	ND	0.500	"								
Dibromochloromethane	ND	0.500	"								
Dibromomethane	ND	0.500	"								
Dichlorodifluoromethane	ND	0.500	"								
Ethyl Benzene	ND	0.500	"								
Hexachlorobutadiene	0.620	0.500	"								
Isopropylbenzene	ND	0.500	"								
Methyl acetate	ND	0.500	"								
Methyl tert-butyl ether (MTBE)	ND	0.500	"								
Methylcyclohexane	ND	0.500	"								
Methylene chloride	ND	2.00	"								

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60939 - EPA 5030B											
Blank (BB60939-BLK1) Blank								Prepared & Analyzed: 02/17/2026			
n-Butylbenzene	ND	0.500	ug/L								
n-Propylbenzene	ND	0.500	"								
o-Xylene	ND	0.500	"								
p- & m- Xylenes	ND	1.00	"								
p-Isopropyltoluene	ND	0.500	"								
sec-Butylbenzene	ND	0.500	"								
Styrene	ND	0.500	"								
tert-Butyl alcohol (TBA)	ND	1.00	"								
tert-Butylbenzene	ND	0.500	"								
Tetrachloroethylene	ND	0.500	"								
Toluene	ND	0.500	"								
trans-1,2-Dichloroethylene	ND	0.500	"								
trans-1,3-Dichloropropylene	ND	0.500	"								
Trichloroethylene	ND	0.500	"								
Trichlorofluoromethane	ND	0.500	"								
Vinyl Chloride	ND	0.500	"								
Xylenes, Total	ND	1.50	"								
Surrogate: SURR: 1,2-Dichloroethane-d4	*10.7*		*"*	*10.0*		*107*	*69-130*				
Surrogate: SURR: Toluene-d8	*9.88*		*"*	*10.0*		*98.8*	*81-117*				
Surrogate: SURR: p-Bromofluorobenzene	*9.89*		*"*	*10.0*		*98.9*	*79-122*				
LCS (BB60939-BS1) LCS								Prepared & Analyzed: 02/17/2026			
1,1,1,2-Tetrachloroethane	9.59		ug/L	10.0		95.9	82-126				
1,1,1-Trichloroethane	9.70		"	10.0		97.0	78-136				
1,1,2,2-Tetrachloroethane	9.66		"	10.0		96.6	76-129				
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	10.6	0.500	"				54-165				
1,1,2-Trichloroethane	9.26		"	10.0		92.6	82-123				
1,1-Dichloroethane	9.49		"	10.0		94.9	82-129				
1,1-Dichloroethylene	9.57		"	10.0		95.7	68-138				
1,2,3-Trichlorobenzene	8.75		"	10.0		87.5	76-136				
1,2,3-Trichloropropane	9.58		"	10.0		95.8	77-128				
1,2,4-Trichlorobenzene	8.97		"	10.0		89.7	76-137				
1,2,4-Trimethylbenzene	9.11		"	10.0		91.1	82-132				
1,2-Dibromo-3-chloropropane	9.41		"	10.0		94.1	45-147				
1,2-Dibromoethane	9.45		"	10.0		94.5	83-124				
1,2-Dichlorobenzene	9.21		"	10.0		92.1	79-123				
1,2-Dichloroethane	9.36		"	10.0		93.6	73-132				
1,2-Dichloropropane	8.71		"	10.0		87.1	78-126				
1,3,5-Trimethylbenzene	9.24		"	10.0		92.4	80-131				
1,3-Dichlorobenzene	9.12		"	10.0		91.2	86-122				
1,4-Dichlorobenzene	9.21		"	10.0		92.1	85-124				
2-Butanone	8.31		"	10.0		83.1	49-152				
2-Hexanone	8.33		"	10.0		83.3	51-146				
4-Methyl-2-pentanone	8.93		"	10.0		89.3	57-145				
Acetone	6.99		"	10.0		69.9	14-150				
Acrolein	38.6		"	40.0		96.4	10-153				
Acrylonitrile	10.3		"	10.0		103	51-150				
Benzene	9.55		"	10.0		95.5	85-126				
Bromochloromethane	9.70		"	10.0		97.0	77-128				
Bromodichloromethane	9.31		"	10.0		93.1	79-128				

Volatile Organic Compounds by GC/MS - Quality Control Data

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Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60939 - EPA 5030B											
LCS (BB60939-BS1) LCS							Prepared & Analyzed: 02/17/2026				
Bromoform	9.12		ug/L	10.0		91.2	78-133				
Bromomethane	8.02		"	10.0		80.2	43-168				
Carbon disulfide	9.33		"	10.0		93.3	68-146				
Carbon tetrachloride	10.5		"	10.0		105	77-141				
Chlorobenzene	9.07		"	10.0		90.7	88-120				
Chloroethane	12.0		"	10.0		120	65-136				
Chloroform	9.28		"	10.0		92.8	82-128				
Chloromethane	7.27		"	10.0		72.7	43-155				
cis-1,2-Dichloroethylene	9.73		"	10.0		97.3	83-129				
cis-1,3-Dichloropropylene	9.64		"	10.0		96.4	80-131				
Cyclohexane	10.6		"	10.0		106	63-149				
Dibromochloromethane	9.75		"	10.0		97.5	80-130				
Dibromomethane	9.54		"	10.0		95.4	72-134				
Dichlorodifluoromethane	11.4		"	10.0		114	44-144				
Ethyl Benzene	9.05		"	10.0		90.5	80-131				
Hexachlorobutadiene	7.18		"	10.0		71.8	67-146				
Isopropylbenzene	9.78		"	10.0		97.8	76-140				
Methyl acetate	9.37		"	10.0		93.7	51-139				
Methyl tert-butyl ether (MTBE)	9.27		"	20.0		46.4	76-135	Low Bias			
Methylcyclohexane	11.2		"	10.0		112	72-143				
Methylene chloride	9.08		"	10.0		90.8	55-137				
n-Butylbenzene	9.58		"	10.0		95.8	79-132				
n-Propylbenzene	9.47		"	10.0		94.7	78-133				
o-Xylene	9.04		"	10.0		90.4	78-130				
p- & m- Xylenes	18.5		"	20.0		92.3	77-133				
p-Isopropyltoluene	9.59		"	10.0		95.9	81-136				
sec-Butylbenzene	9.58		"	10.0		95.8	79-137				
Styrene	9.23		"	10.0		92.3	67-132				
tert-Butyl alcohol (TBA)	46.2		"	50.0		92.5	25-162				
tert-Butylbenzene	9.26		"	10.0		92.6	77-138				
Tetrachloroethylene	6.27		"	10.0		62.7	82-131	Low Bias			
Toluene	9.05		"	10.0		90.5	80-127				
trans-1,2-Dichloroethylene	9.37		"	10.0		93.7	80-132				
trans-1,3-Dichloropropylene	9.73		"	10.0		97.3	78-131				
Trichloroethylene	8.95		"	10.0		89.5	82-128				
Trichlorofluoromethane	11.1		"	10.0		111	67-139				
Vinyl Chloride	10.7		"	10.0		107	58-145				
Surrogate: SURR: 1,2-Dichloroethane-d4	*9.96*		*"*	*10.0*		*99.6*	*69-130*				
Surrogate: SURR: Toluene-d8	*9.82*		*"*	*10.0*		*98.2*	*81-117*				
Surrogate: SURR: p-Bromofluorobenzene	*10.2*		*"*	*10.0*		*102*	*79-122*				

Volatile Organic Compounds by GC/MS - Quality Control Data

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Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60939 - EPA 5030B											
LCS Dup (BB60939-BSD1) LCS Dup							Prepared & Analyzed: 02/17/2026				
1,1,1,2-Tetrachloroethane	11.0		ug/L	10.0		110	82-126		13.8	30	
1,1,1-Trichloroethane	11.4		"	10.0		114	78-136		15.9	30	
1,1,2,2-Tetrachloroethane	11.1		"	10.0		111	76-129		14.1	30	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	12.4	0.500	"				54-165		15.6	30	
1,1,2-Trichloroethane	10.5		"	10.0		105	82-123		12.6	30	
1,1-Dichloroethane	11.2		"	10.0		112	82-129		16.6	30	
1,1-Dichloroethylene	11.1		"	10.0		111	68-138		14.5	30	
1,2,3-Trichlorobenzene	10.3		"	10.0		103	76-136		16.0	30	
1,2,3-Trichloropropane	11.0		"	10.0		110	77-128		13.8	30	
1,2,4-Trichlorobenzene	10.6		"	10.0		106	76-137		16.9	30	
1,2,4-Trimethylbenzene	10.7		"	10.0		107	82-132		16.1	30	
1,2-Dibromo-3-chloropropane	10.6		"	10.0		106	45-147		11.7	30	
1,2-Dibromoethane	10.9		"	10.0		109	83-124		13.9	30	
1,2-Dichlorobenzene	10.8		"	10.0		108	79-123		15.5	30	
1,2-Dichloroethane	11.0		"	10.0		110	73-132		16.5	30	
1,2-Dichloropropane	10.0		"	10.0		100	78-126		13.9	30	
1,3,5-Trimethylbenzene	10.7		"	10.0		107	80-131		14.6	30	
1,3-Dichlorobenzene	10.8		"	10.0		108	86-122		16.7	30	
1,4-Dichlorobenzene	10.8		"	10.0		108	85-124		16.2	30	
2-Butanone	10.1		"	10.0		101	49-152		19.2	30	
2-Hexanone	9.90		"	10.0		99.0	51-146		17.2	30	
4-Methyl-2-pentanone	10.7		"	10.0		107	57-145		17.7	30	
Acetone	7.67		"	10.0		76.7	14-150		9.28	30	
Acrolein	45.9		"	40.0		115	10-153		17.3	30	
Acrylonitrile	12.9		"	10.0		129	51-150		22.0	30	
Benzene	11.4		"	10.0		114	85-126		17.4	30	
Bromochloromethane	11.2		"	10.0		112	77-128		13.9	30	
Bromodichloromethane	10.8		"	10.0		108	79-128		15.3	30	
Bromoform	10.6		"	10.0		106	78-133		14.8	30	
Bromomethane	10.6		"	10.0		106	43-168		27.9	30	
Carbon disulfide	11.1		"	10.0		111	68-146		17.1	30	
Carbon tetrachloride	12.2		"	10.0		122	77-141		14.6	30	
Chlorobenzene	10.6		"	10.0		106	88-120		15.5	30	
Chloroethane	15.1		"	10.0		151	65-136	High Bias	22.3	30	
Chloroform	11.1		"	10.0		111	82-128		17.7	30	
Chloromethane	8.52		"	10.0		85.2	43-155		15.8	30	
cis-1,2-Dichloroethylene	11.3		"	10.0		113	83-129		14.9	30	
cis-1,3-Dichloropropylene	11.0		"	10.0		110	80-131		13.5	30	
Cyclohexane	12.7		"	10.0		127	63-149		18.2	30	
Dibromochloromethane	11.4		"	10.0		114	80-130		15.3	30	
Dibromomethane	11.2		"	10.0		112	72-134		16.5	30	
Dichlorodifluoromethane	13.6		"	10.0		136	44-144		18.2	30	
Ethyl Benzene	10.5		"	10.0		105	80-131		15.2	30	
Hexachlorobutadiene	8.79		"	10.0		87.9	67-146		20.2	30	
Isopropylbenzene	11.4		"	10.0		114	76-140		15.6	30	
Methyl acetate	10.5		"	10.0		105	51-139		11.1	30	
Methyl tert-butyl ether (MTBE)	11.0		"	20.0		54.8	76-135	Low Bias	16.7	30	
Methylcyclohexane	13.1		"	10.0		131	72-143		16.2	30	
Methylene chloride	10.8		"	10.0		108	55-137		17.8	30	
n-Butylbenzene	11.2		"	10.0		112	79-132		15.3	30	

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Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60939 - EPA 5030B											
LCS Dup (BB60939-BSD1) LCS Dup								Prepared & Analyzed: 02/17/2026			
n-Propylbenzene	11.2		ug/L	10.0		112	78-133		16.6	30	
o-Xylene	10.7		"	10.0		107	78-130		16.4	30	
p- & m- Xylenes	21.3		"	20.0		106	77-133		14.1	30	
p-Isopropyltoluene	11.2		"	10.0		112	81-136		15.8	30	
sec-Butylbenzene	11.2		"	10.0		112	79-137		15.9	30	
Styrene	10.8		"	10.0		108	67-132		16.1	30	
tert-Butyl alcohol (TBA)	56.5		"	50.0		113	25-162		20.0	30	
tert-Butylbenzene	10.9		"	10.0		109	77-138		16.3	30	
Tetrachloroethylene	7.36		"	10.0		73.6	82-131	Low Bias	16.0	30	
Toluene	10.5		"	10.0		105	80-127		14.5	30	
trans-1,2-Dichloroethylene	11.3		"	10.0		113	80-132		18.3	30	
trans-1,3-Dichloropropylene	11.1		"	10.0		111	78-131		13.2	30	
Trichloroethylene	10.1		"	10.0		101	82-128		12.2	30	
Trichlorofluoromethane	13.2		"	10.0		132	67-139		17.9	30	
Vinyl Chloride	12.7		"	10.0		127	58-145		17.3	30	
Surrogate: SURR: 1,2-Dichloroethane-d4	*10.2*		*"*	*10.0*		*102*	*69-130*				
Surrogate: SURR: Toluene-d8	*9.64*		*"*	*10.0*		*96.4*	*81-117*				
Surrogate: SURR: p-Bromofluorobenzene	*10.2*		*"*	*10.0*		*102*	*79-122*				
Batch BB60984 - EPA 5030B											
Blank (BB60984-BLK1) Blank								Prepared & Analyzed: 02/18/2026			
1,1,1,2-Tetrachloroethane	ND	0.500	ug/L								
1,1,1-Trichloroethane	ND	0.500	"								
1,1,2,2-Tetrachloroethane	ND	0.500	"								
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.500	"								
1,1,2-Trichloroethane	ND	0.500	"								
1,1-Dichloroethane	ND	0.500	"								
1,1-Dichloroethylene	ND	0.500	"								
1,2,3-Trichlorobenzene	0.230	0.500	"								
1,2,3-Trichloropropane	ND	0.500	"								
1,2,4-Trichlorobenzene	ND	0.500	"								
1,2,4-Trimethylbenzene	ND	0.500	"								
1,2-Dibromo-3-chloropropane	ND	0.500	"								
1,2-Dibromoethane	ND	0.500	"								
1,2-Dichlorobenzene	ND	0.500	"								
1,2-Dichloroethane	ND	0.500	"								
1,2-Dichloropropane	ND	0.500	"								
1,3,5-Trimethylbenzene	ND	0.500	"								
1,3-Dichlorobenzene	ND	0.500	"								
1,4-Dichlorobenzene	ND	0.500	"								
2-Butanone	ND	0.500	"								
2-Hexanone	ND	0.500	"								
4-Methyl-2-pentanone	ND	0.500	"								
Acetone	ND	2.00	"								
Acrolein	ND	0.500	"								
Acrylonitrile	ND	0.500	"								
Benzene	ND	0.500	"								
Bromochloromethane	ND	0.500	"								
Bromodichloromethane	ND	0.500	"								
Bromoform	ND	0.500	"								

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Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60984 - EPA 5030B											
Blank (BB60984-BLK1) Blank									Prepared & Analyzed: 02/18/2026		
Bromomethane	ND	2.00	ug/L								
Carbon disulfide	ND	0.500	"								
Carbon tetrachloride	ND	0.500	"								
Chlorobenzene	ND	0.500	"								
Chloroethane	ND	0.500	"								
Chloroform	ND	0.500	"								
Chloromethane	ND	0.500	"								
cis-1,2-Dichloroethylene	ND	0.500	"								
cis-1,3-Dichloropropylene	ND	0.500	"								
Cyclohexane	ND	0.500	"								
Dibromochloromethane	ND	0.500	"								
Dibromomethane	ND	0.500	"								
Dichlorodifluoromethane	ND	0.500	"								
Ethyl Benzene	ND	0.500	"								
Hexachlorobutadiene	ND	0.500	"								
Isopropylbenzene	ND	0.500	"								
Methyl acetate	ND	0.500	"								
Methyl tert-butyl ether (MTBE)	ND	0.500	"								
Methylcyclohexane	ND	0.500	"								
Methylene chloride	ND	2.00	"								
n-Butylbenzene	ND	0.500	"								
n-Propylbenzene	ND	0.500	"								
o-Xylene	ND	0.500	"								
p- & m- Xylenes	ND	1.00	"								
p-Isopropyltoluene	ND	0.500	"								
sec-Butylbenzene	ND	0.500	"								
Styrene	ND	0.500	"								
tert-Butyl alcohol (TBA)	ND	1.00	"								
tert-Butylbenzene	ND	0.500	"								
Tetrachloroethylene	ND	0.500	"								
Toluene	ND	0.500	"								
trans-1,2-Dichloroethylene	ND	0.500	"								
trans-1,3-Dichloropropylene	ND	0.500	"								
Trichloroethylene	ND	0.500	"								
Trichlorofluoromethane	ND	0.500	"								
Vinyl Chloride	ND	0.500	"								
Xylenes, Total	ND	1.50	"								
Surrogate: SURR: 1,2-Dichloroethane-d4	*10.8*		*"*	*10.0*		*108*	*69-130*				
Surrogate: SURR: Toluene-d8	*9.82*		*"*	*10.0*		*98.2*	*81-117*				
Surrogate: SURR: p-Bromofluorobenzene	*10.1*		*"*	*10.0*		*101*	*79-122*				

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60984 - EPA 5030B											
LCS (BB60984-BS1) LCS							Prepared & Analyzed: 02/18/2026				
1,1,1,2-Tetrachloroethane	11.2		ug/L	10.0		112	82-126				
1,1,1-Trichloroethane	11.4		"	10.0		114	78-136				
1,1,2,2-Tetrachloroethane	10.9		"	10.0		109	76-129				
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	11.8	0.500	"				54-165				
1,1,2-Trichloroethane	10.6		"	10.0		106	82-123				
1,1-Dichloroethane	11.1		"	10.0		111	82-129				
1,1-Dichloroethylene	10.9		"	10.0		109	68-138				
1,2,3-Trichlorobenzene	9.54		"	10.0		95.4	76-136				
1,2,3-Trichloropropane	10.8		"	10.0		108	77-128				
1,2,4-Trichlorobenzene	10.2		"	10.0		102	76-137				
1,2,4-Trimethylbenzene	10.4		"	10.0		104	82-132				
1,2-Dibromo-3-chloropropane	10.2		"	10.0		102	45-147				
1,2-Dibromoethane	11.0		"	10.0		110	83-124				
1,2-Dichlorobenzene	10.3		"	10.0		103	79-123				
1,2-Dichloroethane	10.8		"	10.0		108	73-132				
1,2-Dichloropropane	10.3		"	10.0		103	78-126				
1,3,5-Trimethylbenzene	10.5		"	10.0		105	80-131				
1,3-Dichlorobenzene	10.3		"	10.0		103	86-122				
1,4-Dichlorobenzene	10.6		"	10.0		106	85-124				
2-Butanone	9.17		"	10.0		91.7	49-152				
2-Hexanone	9.37		"	10.0		93.7	51-146				
4-Methyl-2-pentanone	10.1		"	10.0		101	57-145				
Acetone	7.84		"	10.0		78.4	14-150				
Acrolein	40.0		"	40.0		100	10-153				
Acrylonitrile	12.2		"	10.0		122	51-150				
Benzene	11.2		"	10.0		112	85-126				
Bromochloromethane	11.3		"	10.0		113	77-128				
Bromodichloromethane	10.9		"	10.0		109	79-128				
Bromoform	10.4		"	10.0		104	78-133				
Bromomethane	9.56		"	10.0		95.6	43-168				
Carbon disulfide	10.9		"	10.0		109	68-146				
Carbon tetrachloride	12.0		"	10.0		120	77-141				
Chlorobenzene	10.6		"	10.0		106	88-120				
Chloroethane	13.1		"	10.0		131	65-136				
Chloroform	11.0		"	10.0		110	82-128				
Chloromethane	6.95		"	10.0		69.5	43-155				
cis-1,2-Dichloroethylene	11.4		"	10.0		114	83-129				
cis-1,3-Dichloropropylene	11.2		"	10.0		112	80-131				
Cyclohexane	10.4		"	10.0		104	63-149				
Dibromochloromethane	11.2		"	10.0		112	80-130				
Dibromomethane	11.3		"	10.0		113	72-134				
Dichlorodifluoromethane	7.43		"	10.0		74.3	44-144				
Ethyl Benzene	10.7		"	10.0		107	80-131				
Hexachlorobutadiene	7.95		"	10.0		79.5	67-146				
Isopropylbenzene	10.9		"	10.0		109	76-140				
Methyl acetate	9.97		"	10.0		99.7	51-139				
Methyl tert-butyl ether (MTBE)	10.3		"	20.0		51.4	76-135	Low Bias			
Methylcyclohexane	10.2		"	10.0		102	72-143				
Methylene chloride	10.8		"	10.0		108	55-137				
n-Butylbenzene	10.1		"	10.0		101	79-132				

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60984 - EPA 5030B											
LCS (BB60984-BS1) LCS							Prepared & Analyzed: 02/18/2026				
n-Propylbenzene	10.6		ug/L	10.0		106	78-133				
o-Xylene	10.8		"	10.0		108	78-130				
p- & m- Xylenes	21.6		"	20.0		108	77-133				
p-Isopropyltoluene	10.4		"	10.0		104	81-136				
sec-Butylbenzene	10.2		"	10.0		102	79-137				
Styrene	11.0		"	10.0		110	67-132				
tert-Butyl alcohol (TBA)	46.5		"	50.0		93.1	25-162				
tert-Butylbenzene	10.1		"	10.0		101	77-138				
Tetrachloroethylene	7.30		"	10.0		73.0	82-131	Low Bias			
Toluene	10.7		"	10.0		107	80-127				
trans-1,2-Dichloroethylene	11.2		"	10.0		112	80-132				
trans-1,3-Dichloropropylene	11.0		"	10.0		110	78-131				
Trichloroethylene	10.5		"	10.0		105	82-128				
Trichlorofluoromethane	11.2		"	10.0		112	67-139				
Vinyl Chloride	10.4		"	10.0		104	58-145				
Surrogate: SURR: 1,2-Dichloroethane-d4	*10.1*		*"*	*10.0*		*101*	*69-130*				
Surrogate: SURR: Toluene-d8	*10.0*		*"*	*10.0*		*100*	*81-117*				
Surrogate: SURR: p-Bromofluorobenzene	*10.0*		*"*	*10.0*		*100*	*79-122*				
LCS Dup (BB60984-BSD1) LCS Dup							Prepared & Analyzed: 02/18/2026				
1,1,1,2-Tetrachloroethane	10.8		ug/L	10.0		108	82-126		4.19	30	
1,1,1-Trichloroethane	10.9		"	10.0		109	78-136		4.76	30	
1,1,2,2-Tetrachloroethane	10.7		"	10.0		107	76-129		2.41	30	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	10.3	0.500	"				54-165		13.0	30	
1,1,2-Trichloroethane	10.1		"	10.0		101	82-123		4.91	30	
1,1-Dichloroethane	10.3		"	10.0		103	82-129		7.29	30	
1,1-Dichloroethylene	9.51		"	10.0		95.1	68-138		13.6	30	
1,2,3-Trichlorobenzene	9.86		"	10.0		98.6	76-136		3.30	30	
1,2,3-Trichloropropane	10.8		"	10.0		108	77-128		0.00	30	
1,2,4-Trichlorobenzene	9.99		"	10.0		99.9	76-137		2.28	30	
1,2,4-Trimethylbenzene	10.1		"	10.0		101	82-132		3.51	30	
1,2-Dibromo-3-chloropropane	9.75		"	10.0		97.5	45-147		4.02	30	
1,2-Dibromoethane	10.5		"	10.0		105	83-124		4.46	30	
1,2-Dichlorobenzene	10.1		"	10.0		101	79-123		2.45	30	
1,2-Dichloroethane	10.2		"	10.0		102	73-132		5.81	30	
1,2-Dichloropropane	9.58		"	10.0		95.8	78-126		7.05	30	
1,3,5-Trimethylbenzene	10.4		"	10.0		104	80-131		1.05	30	
1,3-Dichlorobenzene	10.2		"	10.0		102	86-122		0.878	30	
1,4-Dichlorobenzene	10.1		"	10.0		101	85-124		4.54	30	
2-Butanone	9.34		"	10.0		93.4	49-152		1.84	30	
2-Hexanone	9.26		"	10.0		92.6	51-146		1.18	30	
4-Methyl-2-pentanone	10.3		"	10.0		103	57-145		1.87	30	
Acetone	7.32		"	10.0		73.2	14-150		6.86	30	
Acrolein	36.6		"	40.0		91.5	10-153		8.80	30	
Acrylonitrile	11.5		"	10.0		115	51-150		6.00	30	
Benzene	10.5		"	10.0		105	85-126		7.28	30	
Bromochloromethane	10.5		"	10.0		105	77-128		6.87	30	
Bromodichloromethane	10.3		"	10.0		103	79-128		6.12	30	
Bromoform	9.71		"	10.0		97.1	78-133		6.38	30	
Bromomethane	8.61		"	10.0		86.1	43-168		10.5	30	

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60984 - EPA 5030B											
LCS Dup (BB60984-BSD1) LCS Dup							Prepared & Analyzed: 02/18/2026				
Carbon disulfide	8.57		ug/L	10.0		85.7	68-146		23.8	30	
Carbon tetrachloride	11.2		"	10.0		112	77-141		7.67	30	
Chlorobenzene	10.2		"	10.0		102	88-120		4.41	30	
Chloroethane	11.6		"	10.0		116	65-136		12.2	30	
Chloroform	10.3		"	10.0		103	82-128		6.85	30	
Chloromethane	5.13		"	10.0		51.3	43-155		30.1	30	Non-dir.
cis-1,2-Dichloroethylene	10.8		"	10.0		108	83-129		6.03	30	
cis-1,3-Dichloropropylene	10.5		"	10.0		105	80-131		6.07	30	
Cyclohexane	9.77		"	10.0		97.7	63-149		6.34	30	
Dibromochloromethane	10.8		"	10.0		108	80-130		3.72	30	
Dibromomethane	10.4		"	10.0		104	72-134		9.03	30	
Dichlorodifluoromethane	3.57		"	10.0		35.7	44-144	Low Bias	70.2	30	Non-dir.
Ethyl Benzene	10.2		"	10.0		102	80-131		4.88	30	
Hexachlorobutadiene	7.86		"	10.0		78.6	67-146		1.14	30	
Isopropylbenzene	10.7		"	10.0		107	76-140		1.39	30	
Methyl acetate	9.95		"	10.0		99.5	51-139		0.201	30	
Methyl tert-butyl ether (MTBE)	9.90		"	20.0		49.5	76-135	Low Bias	3.77	30	
Methylcyclohexane	10.0		"	10.0		100	72-143		2.17	30	
Methylene chloride	9.90		"	10.0		99.0	55-137		8.97	30	
n-Butylbenzene	10.1		"	10.0		101	79-132		0.198	30	
n-Propylbenzene	10.3		"	10.0		103	78-133		2.39	30	
o-Xylene	10.2		"	10.0		102	78-130		6.18	30	
p- & m- Xylenes	20.5		"	20.0		102	77-133		4.99	30	
p-Isopropyltoluene	10.4		"	10.0		104	81-136		0.482	30	
sec-Butylbenzene	10.0		"	10.0		100	79-137		1.39	30	
Styrene	10.5		"	10.0		105	67-132		4.01	30	
tert-Butyl alcohol (TBA)	49.5		"	50.0		99.0	25-162		6.18	30	
tert-Butylbenzene	10.2		"	10.0		102	77-138		0.492	30	
Tetrachloroethylene	6.95		"	10.0		69.5	82-131	Low Bias	4.91	30	
Toluene	10.2		"	10.0		102	80-127		5.18	30	
trans-1,2-Dichloroethylene	10.3		"	10.0		103	80-132		8.12	30	
trans-1,3-Dichloropropylene	10.6		"	10.0		106	78-131		3.52	30	
Trichloroethylene	9.91		"	10.0		99.1	82-128		5.69	30	
Trichlorofluoromethane	9.86		"	10.0		98.6	67-139		12.7	30	
Vinyl Chloride	8.15		"	10.0		81.5	58-145		24.7	30	
Surrogate: SURR: 1,2-Dichloroethane-d4	*10.2*		*"*	*10.0*		*102*	*69-130*				
Surrogate: SURR: Toluene-d8	*10.1*		*"*	*10.0*		*101*	*81-117*				
Surrogate: SURR: p-Bromofluorobenzene	*10.3*		*"*	*10.0*		*103*	*79-122*				

Volatile Analysis Sample Containers

Lab ID	Client Sample ID	Volatile Sample Container
26B0750-01	TS-01-C1	40mL Clear Vial (pre-pres.) HCl; Cool to 4° C

Sample and Data Qualifiers Relating to This Work Order

QL-02	This LCS analyte is outside Laboratory Recovery limits due the analyte behavior using the referenced method. The reference method has certain limitations with respect to analytes of this nature.
ICVE	The value reported is ESTIMATED. The value is estimated due to its behavior during initial calibration verification (recovery exceeded 30% of expected value).
CCVE	The value reported is ESTIMATED. The value is estimated due to its behavior during continuing calibration verification (>20% Difference for average Rf or >20% Drift for quadratic fit).
B	Analyte is found in the associated analysis batch blank. For volatiles, methylene chloride and acetone are common lab contaminants.
/\	Analyte is not certified but the state of sample origination offer certification for the Analyte

Definitions and Other Explanations

*	Analyte is not certified or the state of the samples origination does not offer certification for the Analyte.
ND	NOT DETECTED - the analyte is not detected at the Reported to level (LOQ/RL or LOD/MDL)
RL	REPORTING LIMIT - the minimum reportable value based upon the lowest point in the analyte calibration curve.
LOQ	LIMIT OF QUANTITATION - the minimum concentration of a target analyte that can be reported within a specified degree of confidence. This is the lowest point in an analyte calibration curve that has been subjected to all steps of the processing/analysis and verified to meet defined criteria. This is based upon NELAC 2009 Standards and applies to all analyses.
LOD	LIMIT OF DETECTION - a verified estimate of the minimum concentration of a substance in a given matrix that an analytical process can reliably detect. This is based upon NELAC 2009 Standards and applies to all analyses conducted under the auspices of EPA SW-846.
MDL	METHOD DETECTION LIMIT - a statistically derived estimate of the minimum amount of a substance an analytical system can reliably detect with a 99% confidence that the concentration of the substance is greater than zero. This is based upon 40 CFR Part 136 Appendix B and applies only to EPA 600 and 200 series methods.
Reported to	This indicates that the data for a particular analysis is reported to either the LOD/MDL, or the LOQ/RL. In cases where the "Reported to" is located above the LOD/MDL, any value between this and the LOQ represents an estimated value which is "J" flagged accordingly. This applies to volatile and semi-volatile target compounds only.
NR	Not reported
RPD	Relative Percent Difference
Wet	The data has been reported on an as-received (wet weight) basis
Low Bias	Low Bias flag indicates that the recovery of the flagged analyte is below the laboratory or regulatory lower control limit. The data user should take note that this analyte may be biased low but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
High Bias	High Bias flag indicates that the recovery of the flagged analyte is above the laboratory or regulatory upper control limit. The data user should take note that this analyte may be biased high but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
Non-Dir.	Non-dir. flag (Non-Directional Bias) indicates that the Relative Percent Difference (RPD) (a measure of precision) among the MS and MSD data is outside the laboratory or regulatory control limit. This alerts the data user where the MS and MSD are from site-specific samples that the RPD is high due to either non-homogeneous distribution of target analyte between the MS/MSD or indicates poor reproducibility for other reasons.

If EPA SW-846 method 8270 is included herein it is noted that the target compound N-nitrosodiphenylamine (NDPA) decomposes in the gas chromatographic inlet and cannot be separated from diphenylamine (DPA). These results could actually represent 100% DPA, 100% NDPA or some combination of the two. For this reason, ALS reports the combined result for n-nitrosodiphenylamine and diphenylamine for either of these compounds as a combined concentration as Diphenylamine.

If Total PCBs are detected and the target aroclors reported are "Not detected", the Total PCB value is reported due to the presence of either or both Aroclors 1262 and 1268 which are non-target aroclors for some regulatory lists.

2-chloroethylvinyl ether readily breaks down under acidic conditions. Samples that are acid preserved, including standards will exhibit breakdown. The data user should take note.

Certification for pH is no longer offered by NYDOH ELAP.

Semi-Volatile and Volatile analyses are reported down to the LOD/MDL, with values between the LOD/MDL and the LOQ being "J" flagged as estimated results.

For analyses by EPA SW-846-8270D, the Limit of Quantitation (LOQ) reported for benzidine is based upon the lowest standard used for calibration and is not a verified LOQ due to this compound's propensity for oxidative losses during extraction/concentration procedures and non-reproducible chromatographic performance.

Field Chain-of-Custody Record

ALS Project Number: 26B0750

ALS' Standard Terms & Conditions are listed on the back side of this document. This legal document serves as your written authorization for ALS to proceed with the analyses requested below. Your signature binds you to ALS' Standard Terms & Conditions.

120 Research Drive Stratford, CT 06615 132-02 89th Ave Queens, NY 11418 56 Church Hill Rd. #2 Newtown, CT 06470 2161 Whitesville Rd Toms River, NJ 08755 clientservices@yorklab.com 800-306-YORK 800-306-9675

Report To:	Invoice To:	YOUR Project Name / Number
Company: LANGAN	Company: SAME	Willets L Parcel. 170197605
Address: 368 9th Ave, 8th Fl, NY - NY 10001	Address: SAME	PO Number
Phone.: 212-479-5400	Phone.:	
Contact: Amita Oka	Contact:	
E-mail: aoka@langan.com	E-mail:	

Samples Collected From: NY ✓ | CT | NJ | PA | Other: (please specify)

Turn-Around Time: RUSH - Next Day | RUSH - Two Day ✓ | RUSH - Three Day | RUSH - Four Day | RUSH - Five Day | Standard (6-9 Day) | PFAS Standard 7-10 Day

Please print clearly and legibly. All information must be complete. Samples will not be logged in and the turn-around-time clock will not begin until any questions by ALS are resolved.

Padmanabhan Krishnaswamy

Samples Collected by: (print AND sign your name)

Matrix Codes: S - soil/solid/sludge; GW - groundwater; DW - drinking water; SW - surface water; WW - wastewater; O - Oil; Other

Preservative (please list number of containers)

Analyses Requested: TCL VOCs X

Sample Identification	Date	Time	Matrix	Unpreserved	HCl (hydrochloric acid)	MeOH (methanol)	HNO_3 (nitric acid)	H_2SO_4 (sulfuric acid)	NaOH (sodium hydroxide)	$Na_2S_2O_3$ (sodium thio.)	Trizma	Ammonium Acetate	Other:	Grab or Comp. G/C
TS-01-C1	2/17/26	15:00	GW		✓									

Report Type (circle): QA Report | Summary (Results Only) | NY ASP B Package | NJ Reduced | NJ DKQP | NJ Full | CT RCP

EDD Type (circle): EQuIS (standard) | NYSDEC EQuIS | NJDEP SRP Haz Site | Standard Excel | CMDP | Other:

Regulatory Comparative: Compared to the following Regulation(s): (please fill in)

Field Filtered | Lab Filtered

Comments: Please cc: PKrishnaswamy@Langan.com

Samples iced/chilled at time of lab pickup? circle Yes or No

Lab Sample Receiving Checklist (to be completed by the receiving laboratory only) Circle Y / N

Custody Seals: Y / N Containers Intact: Y / N COC/Labels Agree: Y / N Preservation Confirmed: Y / N

COC Complete: Y / N COC Received: Y / N Appropriate Sample Volumes: Y / N Appropriate Sample Containers: Y / N

Cooler Temperature Confirmed: Y / N Samples Submitted within Holding Times: Y / N Corrective Action Form Required: Y / N

Samples Relinquished by / Company	Date/Time	1. Samples Received by / Company	Date/Time	2. Samples Relinquished by / Company	Date/Time
Padmanabhan Krishnaswamy / Langan	2/17/26 15:20		2/17/26 1552		2/17/26 1652
Samples Received by / Company	Date/Time	3. Samples Relinquished by / Company	Date/Time	3. Samples Received by / Company	Date/Time
	2/17/26 2:9 1652		2/17/26		2/17/26 16:45
Samples Relinquished by / Company	Date/Time	4. Samples Received by / Company	Date/Time	Samples Received in LAB by	Date/Time / Thermometer ID / Temperature
	2/17/26 19:20				2/17/26 19:20 / 1.1 Degrees C

Technical Report

prepared for:

Langan Engineering & Environmental Services (NYC)
21 Penn Plaza, 360 West 31st Street
New York NY, 10001
Attention: Ellie Seery

Report Date: 02/10/2026
Client Project ID: 170197605
Project (SDG) No.: 26A1279

Report Date: 02/10/2026
Client Project ID: 170197605
Project (SDG) No.: 26A1279

Langan Engineering & Environmental Services (NYC)
21 Penn Plaza, 360 West 31st Street
New York NY, 10001
Attention: Ellie Seery

Purpose and Results

This report contains the analytical data for the sample(s) identified on the attached chain-of-custody received in our laboratory on January 29, 2026 and listed below. The project was identified as your project: **170197605**.

The analyses were conducted utilizing appropriate EPA, Standard Methods, and ASTM methods as detailed in the data summary tables.

All samples were received in proper condition meeting the customary acceptance requirements for environmental samples except those indicated under the Sample and Analysis Qualifiers section of this report.

All analyses met the method and laboratory standard operating procedure requirements except as indicated by any data flags, the meaning of which are explained in the Sample and Data Qualifiers Relating to This Work Order section of this report and case narrative if applicable.

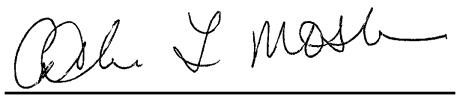
The results of the analyses, which are all reported on dry weight basis (soils) unless otherwise noted, are detailed in the following pages.

Please contact Client Services at 203.325.1371 with any questions regarding this report.

Sample ID	Client Sample ID	Matrix	Date Collected	Date Received
26A1279-01	TMW01_012926	Ground Water	01/29/2026	01/29/2026
26A1279-02	TMW02_012926	Ground Water	01/29/2026	01/29/2026
26A1279-03	TMW03_012926	Ground Water	01/29/2026	01/29/2026
26A1279-04	TMW04_012926	Ground Water	01/29/2026	01/29/2026
26A1279-05	GWDUP01_012926	Ground Water	01/29/2026	01/29/2026

General Notes for Project (SDG) No.: 26A1279

1. The RLs and MDLs (Reporting Limit and Method Detection Limit respectively) reported are adjusted for any dilution necessary due to the levels of target and/or non-target analytes and matrix interference. The RL(REPORTING LIMIT) is based upon the lowest standard utilized for the calibration where applicable.
2. Samples are retained for a period of thirty days after submittal of report, unless other arrangements are made.
3. ALS' liability for the above data is limited to the dollar value paid to ALS for the referenced project.
4. This report shall not be reproduced without the written approval of ALS, Inc.
5. All analyses conducted met method or Laboratory SOP requirements. See the Sample and Data Qualifiers Section for further information.
6. It is noted that no analyses reported herein were subcontracted to another laboratory, unless noted in the report.
7. This report reflects results that relate only to the samples submitted on the attached chain-of-custody form(s) received by ALS.
8. Analyses conducted at ALS, Inc. Stratford, CT are indicated by NY Cert. No. 10854; those conducted at ALS, Inc., Richmond Hill, NY are indicated by NY Cert. No. 12058.

Approved By: 

Cassie Mosher
Laboratory Manager - Stratford

Date: 02/10/2026

Sample Information

Client Sample ID: TMW01_012926 **Sample ID:** 26A1279-01

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1279	170197605	Ground Water	January 29, 2026 10:55 am	01/29/2026

VOA, 8260 LOW MASTER

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND		ug/L	0.216	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-55-6	1,1,1-Trichloroethane	ND		ug/L	0.266	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-34-5	1,1,2,2-Tetrachloroethane	ND		ug/L	0.256	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	CCVE	ug/L	0.286	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-00-5	1,1,2-Trichloroethane	ND		ug/L	0.249	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-34-3	1,1-Dichloroethane	ND		ug/L	0.272	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-35-4	1,1-Dichloroethylene	ND		ug/L	0.327	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-61-6	1,2,3-Trichlorobenzene	ND		ug/L	0.222	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
96-18-4	1,2,3-Trichloropropane	ND		ug/L	0.273	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
120-82-1	1,2,4-Trichlorobenzene	ND		ug/L	0.138	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
95-63-6	**1,2,4-Trimethylbenzene**	**48.2**	B	ug/L	0.310	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
96-12-8	1,2-Dibromo-3-chloropropane	ND		ug/L	0.432	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-93-4	1,2-Dibromoethane	ND		ug/L	0.215	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-50-1	1,2-Dichlorobenzene	ND		ug/L	0.270	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-06-2	1,2-Dichloroethane	ND		ug/L	0.377	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-87-5	1,2-Dichloropropane	ND		ug/L	0.327	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-67-8	**1,3,5-Trimethylbenzene**	**14.7**		ug/L	0.347	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
541-73-1	1,3-Dichlorobenzene	ND		ug/L	0.283	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-46-7	1,4-Dichlorobenzene	ND		ug/L	0.311	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-93-3	**2-Butanone**	**7.70**	QL-02	ug/L	0.421	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: TMW01_012926 **Sample ID:** 26A1279-01

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1279	170197605	Ground Water	January 29, 2026 10:55 am	01/29/2026

VOA, 8260 LOW MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
591-78-6	2-Hexanone	ND	QL-02	ug/L	0.320	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-10-1	**4-Methyl-2-pentanone**	**6.71**	QL-02	ug/L	0.365	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-64-1	**Acetone**	**44.0**	B	ug/L	1.34	2.00	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-02-8	Acrolein	ND		ug/L	0.447	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-13-1	Acrylonitrile	ND		ug/L	0.422	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-43-2	**Benzene**	**12.0**		ug/L	0.279	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-97-5	Bromochloromethane	ND		ug/L	0.354	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
75-27-4	Bromodichloromethane	ND		ug/L	0.245	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-25-2	Bromoform	ND		ug/L	0.163	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-83-9	Bromomethane	ND	CCVE, QL-02	ug/L	0.500	2.00	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-15-0	**Carbon disulfide**	**0.430**		ug/L	0.362	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
56-23-5	Carbon tetrachloride	ND		ug/L	0.204	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-90-7	Chlorobenzene	ND		ug/L	0.284	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-00-3	Chloroethane	ND		ug/L	0.448	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-66-3	Chloroform	ND		ug/L	0.243	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-87-3	Chloromethane	ND	CCVE	ug/L	0.372	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-59-2	cis-1,2-Dichloroethylene	ND		ug/L	0.294	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-01-5	cis-1,3-Dichloropropylene	ND		ug/L	0.262	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
110-82-7	**Cyclohexane**	**1.95**	CCVE	ug/L	0.491	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
124-48-1	Dibromochloromethane	ND		ug/L	0.146	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-95-3	Dibromomethane	ND		ug/L	0.203	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		

Sample Information

Client Sample ID: TMW01_012926 **Sample ID:** 26A1279-01

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1279	170197605	Ground Water	January 29, 2026 10:55 am	01/29/2026

VOA, 8260 LOW MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-71-8	Dichlorodifluoromethane	ND	CCVE	ug/L	0.451	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
100-41-4	**Ethyl Benzene**	**22.1**		ug/L	0.290	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-68-3	Hexachlorobutadiene	ND		ug/L	0.241	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	NYSDOH-NY12058,PADEP-68-04440		
98-82-8	**Isopropylbenzene**	**2.43**		ug/L	0.405	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-20-9	**Methyl acetate**	**9.58**		ug/L	0.442	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
1634-04-4	**Methyl tert-butyl ether (MTBE)**	**94.0**	QL-02	ug/L	1.22	2.50	5	EPA 8260D	02/06/2026 11:26	02/10/2026 03:34	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-87-2	**Methylcyclohexane**	**1.59**	CCVE	ug/L	0.477	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
75-09-2	Methylene chloride	ND		ug/L	0.397	2.00	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
104-51-8	n-Butylbenzene	ND		ug/L	0.399	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
103-65-1	**n-Propylbenzene**	**4.84**		ug/L	0.384	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-47-6	**o-Xylene**	**39.2**	B	ug/L	0.261	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
179601-23-1	**p- & m- Xylenes**	**58.9**	B	ug/L	0.578	1.00	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
99-87-6	**p-Isopropyltoluene**	**0.740**		ug/L	0.377	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
135-98-8	**sec-Butylbenzene**	**0.740**		ug/L	0.444	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
100-42-5	**Styrene**	**6.96**		ug/L	0.255	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-65-0	**tert-Butyl alcohol (TBA)**	**503**		ug/L	3.04	5.00	5	EPA 8260D	02/06/2026 11:26	02/10/2026 03:34	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
98-06-6	tert-Butylbenzene	ND		ug/L	0.367	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
127-18-4	Tetrachloroethylene	ND	CCVE, QL-02	ug/L	0.239	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-88-3	**Toluene**	**43.0**	CCVE, QL-02, B	ug/L	0.346	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-60-5	trans-1,2-Dichloroethylene	ND		ug/L	0.279	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-02-6	trans-1,3-Dichloropropylene	ND		ug/L	0.229	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: TMW01_012926 **Sample ID:** 26A1279-01

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1279	170197605	Ground Water	January 29, 2026 10:55 am	01/29/2026

VOA, 8260 LOW MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
79-01-6	Trichloroethylene	ND		ug/L	0.249	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-69-4	Trichlorofluoromethane	ND	CCVE	ug/L	0.337	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-01-4	Vinyl Chloride	ND	CCVE	ug/L	0.469	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
1330-20-7	**Xylenes, Total**	**98.1**	B	ug/L	0.839	1.50	1	EPA 8260D	02/06/2026 11:26	02/06/2026 16:49	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: SURR: 1,2-Dichloroethane-d4*	*98.9 %*	*69-130*
2037-26-5	*Surrogate: SURR: Toluene-d8*	*97.9 %*	*81-117*
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*97.7 %*	*79-122*

Sample Information

Client Sample ID: TMW02_012926 **Sample ID:** 26A1279-02

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1279	170197605	Ground Water	January 29, 2026 2:22 pm	01/29/2026

VOA, 8260 LOW MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND		ug/L	0.216	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-55-6	1,1,1-Trichloroethane	ND		ug/L	0.266	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-34-5	1,1,2,2-Tetrachloroethane	ND		ug/L	0.256	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	CCVE	ug/L	0.286	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-00-5	1,1,2-Trichloroethane	ND		ug/L	0.249	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-34-3	1,1-Dichloroethane	ND		ug/L	0.272	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-35-4	1,1-Dichloroethylene	ND		ug/L	0.327	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-61-6	1,2,3-Trichlorobenzene	ND		ug/L	0.222	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
96-18-4	1,2,3-Trichloropropane	ND		ug/L	0.273	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
120-82-1	1,2,4-Trichlorobenzene	ND		ug/L	0.138	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
95-63-6	**1,2,4-Trimethylbenzene**	**11.4**	B	ug/L	0.310	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
96-12-8	1,2-Dibromo-3-chloropropane	ND		ug/L	0.432	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-93-4	1,2-Dibromoethane	ND		ug/L	0.215	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-50-1	1,2-Dichlorobenzene	ND		ug/L	0.270	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-06-2	1,2-Dichloroethane	ND		ug/L	0.377	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-87-5	1,2-Dichloropropane	ND		ug/L	0.327	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-67-8	**1,3,5-Trimethylbenzene**	**3.60**		ug/L	0.347	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
541-73-1	**1,3-Dichlorobenzene**	**0.310**		ug/L	0.283	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-46-7	**1,4-Dichlorobenzene**	**0.930**		ug/L	0.311	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-93-3	2-Butanone	ND	QL-02	ug/L	0.421	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
591-78-6	2-Hexanone	ND	QL-02	ug/L	0.320	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: TMW02_012926 **Sample ID:** 26A1279-02

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1279	170197605	Ground Water	January 29, 2026 2:22 pm	01/29/2026

VOA, 8260 LOW MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
108-10-1	**4-Methyl-2-pentanone**	**0.950**	QL-02	ug/L	0.365	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-64-1	**Acetone**	**11.4**	B	ug/L	1.34	2.00	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-02-8	Acrolein	ND		ug/L	0.447	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-13-1	**Acrylonitrile**	**8.64**		ug/L	0.422	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-43-2	**Benzene**	**6.21**		ug/L	0.279	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-97-5	Bromochloromethane	ND		ug/L	0.354	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
75-27-4	Bromodichloromethane	ND		ug/L	0.245	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-25-2	Bromoform	ND		ug/L	0.163	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-83-9	Bromomethane	ND	CCVE, QL-02	ug/L	0.500	2.00	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-15-0	Carbon disulfide	ND		ug/L	0.362	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
56-23-5	Carbon tetrachloride	ND		ug/L	0.204	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-90-7	Chlorobenzene	ND		ug/L	0.284	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-00-3	Chloroethane	ND		ug/L	0.448	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-66-3	Chloroform	ND		ug/L	0.243	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-87-3	Chloromethane	ND	CCVE	ug/L	0.372	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-59-2	cis-1,2-Dichloroethylene	ND		ug/L	0.294	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-01-5	cis-1,3-Dichloropropylene	ND		ug/L	0.262	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
110-82-7	**Cyclohexane**	**1.96**	CCVE	ug/L	0.491	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
124-48-1	Dibromochloromethane	ND		ug/L	0.146	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-95-3	Dibromomethane	ND		ug/L	0.203	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
75-71-8	**Dichlorodifluoromethane**	**6.69**	CCVE	ug/L	0.451	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		

Sample Information

Client Sample ID: TMW02_012926 **Sample ID:** 26A1279-02

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1279	170197605	Ground Water	January 29, 2026 2:22 pm	01/29/2026

VOA, 8260 LOW MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
100-41-4	**Ethyl Benzene**	**5.80**		ug/L	0.290	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-68-3	Hexachlorobutadiene	ND		ug/L	0.241	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	NYSDOH-NY12058,PADEP-68-04440		
98-82-8	**Isopropylbenzene**	**1.09**		ug/L	0.405	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-20-9	Methyl acetate	ND		ug/L	0.442	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
1634-04-4	**Methyl tert-butyl ether (MTBE)**	**70.9**	QL-02	ug/L	0.244	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-87-2	**Methylcyclohexane**	**1.12**	CCVE	ug/L	0.477	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
75-09-2	Methylene chloride	ND		ug/L	0.397	2.00	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
104-51-8	n-Butylbenzene	ND		ug/L	0.399	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
103-65-1	**n-Propylbenzene**	**1.43**		ug/L	0.384	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-47-6	**o-Xylene**	**4.08**	B	ug/L	0.261	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
179601-23-1	**p- & m- Xylenes**	**18.9**	B	ug/L	0.578	1.00	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
99-87-6	p-Isopropyltoluene	ND		ug/L	0.377	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
135-98-8	sec-Butylbenzene	ND		ug/L	0.444	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
100-42-5	**Styrene**	**0.550**		ug/L	0.255	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-65-0	**tert-Butyl alcohol (TBA)**	**179**		ug/L	0.608	1.00	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
98-06-6	tert-Butylbenzene	ND		ug/L	0.367	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
127-18-4	Tetrachloroethylene	ND	CCVE, QL-02	ug/L	0.239	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-88-3	**Toluene**	**2.44**	CCVE, QL-02, B	ug/L	0.346	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-60-5	trans-1,2-Dichloroethylene	ND		ug/L	0.279	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-02-6	trans-1,3-Dichloropropylene	ND		ug/L	0.229	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-01-6	Trichloroethylene	ND		ug/L	0.249	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: TMW02_012926 **Sample ID:** 26A1279-02

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1279	170197605	Ground Water	January 29, 2026 2:22 pm	01/29/2026

VOA, 8260 LOW MASTER

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-69-4	Trichlorofluoromethane	ND	CCVE	ug/L	0.337	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-01-4	Vinyl Chloride	ND	CCVE	ug/L	0.469	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
1330-20-7	**Xylenes, Total**	**23.0**	B	ug/L	0.839	1.50	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:20	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: SURR: 1,2-Dichloroethane-d4*	*102 %*	*69-130*
2037-26-5	*Surrogate: SURR: Toluene-d8*	*99.1 %*	*81-117*
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*100 %*	*79-122*

Sample Information

Client Sample ID: TMW03_012926 **Sample ID:** 26A1279-03

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1279	170197605	Ground Water	January 29, 2026 12:15 pm	01/29/2026

VOA, 8260 LOW MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND		ug/L	0.216	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-55-6	1,1,1-Trichloroethane	ND		ug/L	0.266	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-34-5	1,1,2,2-Tetrachloroethane	ND		ug/L	0.256	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	CCVE	ug/L	0.286	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-00-5	1,1,2-Trichloroethane	ND		ug/L	0.249	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-34-3	1,1-Dichloroethane	ND		ug/L	0.272	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-35-4	1,1-Dichloroethylene	ND		ug/L	0.327	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-61-6	1,2,3-Trichlorobenzene	ND		ug/L	0.222	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
96-18-4	1,2,3-Trichloropropane	ND		ug/L	0.273	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
120-82-1	**1,2,4-Trichlorobenzene**	**0.180**		ug/L	0.138	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
95-63-6	**1,2,4-Trimethylbenzene**	**19.9**	B	ug/L	0.310	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
96-12-8	1,2-Dibromo-3-chloropropane	ND		ug/L	0.432	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-93-4	1,2-Dibromoethane	ND		ug/L	0.215	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-50-1	1,2-Dichlorobenzene	ND		ug/L	0.270	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-06-2	1,2-Dichloroethane	ND		ug/L	0.377	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-87-5	1,2-Dichloropropane	ND		ug/L	0.327	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-67-8	**1,3,5-Trimethylbenzene**	**6.75**		ug/L	0.347	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
541-73-1	1,3-Dichlorobenzene	ND		ug/L	0.283	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-46-7	1,4-Dichlorobenzene	ND		ug/L	0.311	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-93-3	**2-Butanone**	**2.22**	QL-02	ug/L	0.421	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
591-78-6	2-Hexanone	ND	QL-02	ug/L	0.320	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: TMW03_012926 **Sample ID:** 26A1279-03

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1279	170197605	Ground Water	January 29, 2026 12:15 pm	01/29/2026

VOA, 8260 LOW MASTER

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
108-10-1	**4-Methyl-2-pentanone**	**1.39**	QL-02	ug/L	0.365	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-64-1	**Acetone**	**12.6**	B	ug/L	1.34	2.00	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-02-8	Acrolein	ND		ug/L	0.447	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-13-1	Acrylonitrile	ND		ug/L	0.422	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-43-2	**Benzene**	**28.7**		ug/L	0.279	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-97-5	Bromochloromethane	ND		ug/L	0.354	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
75-27-4	Bromodichloromethane	ND		ug/L	0.245	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-25-2	Bromoform	ND		ug/L	0.163	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-83-9	Bromomethane	ND	CCVE, QL-02	ug/L	0.500	2.00	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-15-0	Carbon disulfide	ND		ug/L	0.362	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
56-23-5	Carbon tetrachloride	ND		ug/L	0.204	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-90-7	Chlorobenzene	ND		ug/L	0.284	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-00-3	Chloroethane	ND		ug/L	0.448	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-66-3	Chloroform	ND		ug/L	0.243	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-87-3	Chloromethane	ND	CCVE	ug/L	0.372	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-59-2	cis-1,2-Dichloroethylene	ND		ug/L	0.294	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-01-5	cis-1,3-Dichloropropylene	ND		ug/L	0.262	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
110-82-7	**Cyclohexane**	**1.63**	CCVE	ug/L	0.491	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
124-48-1	Dibromochloromethane	ND		ug/L	0.146	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-95-3	Dibromomethane	ND		ug/L	0.203	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
75-71-8	Dichlorodifluoromethane	ND	CCVE	ug/L	0.451	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		

Sample Information

Client Sample ID: TMW03_012926 **Sample ID:** 26A1279-03

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1279	170197605	Ground Water	January 29, 2026 12:15 pm	01/29/2026

VOA, 8260 LOW MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
100-41-4	**Ethyl Benzene**	**9.42**		ug/L	0.290	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-68-3	Hexachlorobutadiene	ND		ug/L	0.241	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	NYSDOH-NY12058,PADEP-68-04440		
98-82-8	**Isopropylbenzene**	**2.75**		ug/L	0.405	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-20-9	Methyl acetate	ND		ug/L	0.442	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
1634-04-4	**Methyl tert-butyl ether (MTBE)**	**79.0**	QL-02	ug/L	2.44	5.00	10	EPA 8260D	02/06/2026 11:26	02/10/2026 04:05	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-87-2	**Methylcyclohexane**	**2.17**	CCVE	ug/L	0.477	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
75-09-2	Methylene chloride	ND		ug/L	0.397	2.00	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
104-51-8	**n-Butylbenzene**	**0.670**		ug/L	0.399	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
103-65-1	**n-Propylbenzene**	**3.80**		ug/L	0.384	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-47-6	**o-Xylene**	**12.4**	B	ug/L	0.261	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
179601-23-1	**p- & m- Xylenes**	**26.0**	B	ug/L	0.578	1.00	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
99-87-6	**p-Isopropyltoluene**	**1.78**		ug/L	0.377	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
135-98-8	**sec-Butylbenzene**	**1.09**		ug/L	0.444	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
100-42-5	**Styrene**	**1.56**		ug/L	0.255	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-65-0	**tert-Butyl alcohol (TBA)**	**1450**		ug/L	6.08	10.0	10	EPA 8260D	02/06/2026 11:26	02/10/2026 04:05	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
98-06-6	tert-Butylbenzene	ND		ug/L	0.367	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
127-18-4	Tetrachloroethylene	ND	CCVE, QL-02	ug/L	0.239	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-88-3	**Toluene**	**16.7**	CCVE, QL-02, B	ug/L	0.346	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-60-5	trans-1,2-Dichloroethylene	ND		ug/L	0.279	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-02-6	trans-1,3-Dichloropropylene	ND		ug/L	0.229	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-01-6	Trichloroethylene	ND		ug/L	0.249	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: TMW03_012926 **Sample ID:** 26A1279-03

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1279	170197605	Ground Water	January 29, 2026 12:15 pm	01/29/2026

VOA, 8260 LOW MASTER

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-69-4	Trichlorofluoromethane	ND	CCVE	ug/L	0.337	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-01-4	Vinyl Chloride	ND	CCVE	ug/L	0.469	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
1330-20-7	**Xylenes, Total**	**38.3**	B	ug/L	0.839	1.50	1	EPA 8260D	02/06/2026 11:26	02/06/2026 17:52	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: SURR: 1,2-Dichloroethane-d4*	*109 %*	*69-130*
2037-26-5	*Surrogate: SURR: Toluene-d8*	*98.5 %*	*81-117*
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*98.8 %*	*79-122*

Sample Information

Client Sample ID: TMW04_012926 **Sample ID:** 26A1279-04

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1279	170197605	Ground Water	January 29, 2026 1:18 pm	01/29/2026

VOA, 8260 LOW MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND		ug/L	0.216	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-55-6	1,1,1-Trichloroethane	ND		ug/L	0.266	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-34-5	1,1,2,2-Tetrachloroethane	ND		ug/L	0.256	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	CCVE	ug/L	0.286	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-00-5	1,1,2-Trichloroethane	ND		ug/L	0.249	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-34-3	1,1-Dichloroethane	ND		ug/L	0.272	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-35-4	1,1-Dichloroethylene	ND		ug/L	0.327	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-61-6	1,2,3-Trichlorobenzene	ND		ug/L	0.222	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
96-18-4	1,2,3-Trichloropropane	ND		ug/L	0.273	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
120-82-1	1,2,4-Trichlorobenzene	ND		ug/L	0.138	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
95-63-6	**1,2,4-Trimethylbenzene**	**61.7**	B	ug/L	0.310	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
96-12-8	1,2-Dibromo-3-chloropropane	ND		ug/L	0.432	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-93-4	1,2-Dibromoethane	ND		ug/L	0.215	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-50-1	1,2-Dichlorobenzene	ND		ug/L	0.270	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-06-2	1,2-Dichloroethane	ND		ug/L	0.377	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-87-5	1,2-Dichloropropane	ND		ug/L	0.327	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-67-8	**1,3,5-Trimethylbenzene**	**21.4**		ug/L	0.347	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
541-73-1	1,3-Dichlorobenzene	ND		ug/L	0.283	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-46-7	1,4-Dichlorobenzene	ND		ug/L	0.311	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-93-3	**2-Butanone**	**9.48**	QL-02	ug/L	0.421	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
591-78-6	2-Hexanone	ND	QL-02	ug/L	0.320	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: TMW04_012926 **Sample ID:** 26A1279-04

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1279	170197605	Ground Water	January 29, 2026 1:18 pm	01/29/2026

VOA, 8260 LOW MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
108-10-1	**4-Methyl-2-pentanone**	**21.9**	QL-02	ug/L	0.365	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-64-1	**Acetone**	**52.4**	B	ug/L	1.34	2.00	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-02-8	Acrolein	ND		ug/L	0.447	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-13-1	Acrylonitrile	ND		ug/L	0.422	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-43-2	**Benzene**	**45.9**		ug/L	0.279	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-97-5	Bromochloromethane	ND		ug/L	0.354	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
75-27-4	Bromodichloromethane	ND		ug/L	0.245	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-25-2	Bromoform	ND		ug/L	0.163	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-83-9	Bromomethane	ND	CCVE, QL-02	ug/L	0.500	2.00	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-15-0	**Carbon disulfide**	**2.29**		ug/L	0.362	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
56-23-5	Carbon tetrachloride	ND		ug/L	0.204	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-90-7	Chlorobenzene	ND		ug/L	0.284	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-00-3	Chloroethane	ND		ug/L	0.448	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-66-3	Chloroform	ND		ug/L	0.243	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-87-3	Chloromethane	ND	CCVE	ug/L	0.372	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-59-2	cis-1,2-Dichloroethylene	ND		ug/L	0.294	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-01-5	cis-1,3-Dichloropropylene	ND		ug/L	0.262	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
110-82-7	**Cyclohexane**	**4.78**	CCVE	ug/L	0.491	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
124-48-1	Dibromochloromethane	ND		ug/L	0.146	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-95-3	Dibromomethane	ND		ug/L	0.203	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
75-71-8	Dichlorodifluoromethane	ND	CCVE	ug/L	0.451	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		

Sample Information

Client Sample ID: TMW04_012926 **Sample ID:** 26A1279-04

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1279	170197605	Ground Water	January 29, 2026 1:18 pm	01/29/2026

VOA, 8260 LOW MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
100-41-4	**Ethyl Benzene**	**40.8**		ug/L	0.290	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-68-3	Hexachlorobutadiene	ND		ug/L	0.241	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	NYSDOH-NY12058,PADEP-68-04440		
98-82-8	**Isopropylbenzene**	**3.67**		ug/L	0.405	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-20-9	Methyl acetate	ND		ug/L	0.442	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
1634-04-4	**Methyl tert-butyl ether (MTBE)**	**438**	QL-02	ug/L	2.44	5.00	10	EPA 8260D	02/06/2026 11:26	02/10/2026 04:36	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-87-2	**Methylcyclohexane**	**2.82**	CCVE	ug/L	0.477	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
75-09-2	Methylene chloride	ND		ug/L	0.397	2.00	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
104-51-8	**n-Butylbenzene**	**2.02**		ug/L	0.399	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
103-65-1	**n-Propylbenzene**	**5.97**		ug/L	0.384	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-47-6	**o-Xylene**	**62.6**	B	ug/L	0.261	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
179601-23-1	**p- & m- Xylenes**	**92.1**	B	ug/L	0.578	1.00	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
99-87-6	**p-Isopropyltoluene**	**1.04**		ug/L	0.377	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
135-98-8	**sec-Butylbenzene**	**0.630**		ug/L	0.444	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
100-42-5	**Styrene**	**23.5**		ug/L	0.255	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-65-0	**tert-Butyl alcohol (TBA)**	**438**		ug/L	6.08	10.0	10	EPA 8260D	02/06/2026 11:26	02/10/2026 04:36	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
98-06-6	tert-Butylbenzene	ND		ug/L	0.367	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
127-18-4	Tetrachloroethylene	ND	CCVE, QL-02	ug/L	0.239	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-88-3	**Toluene**	**69.3**	B, CCVE, QL-02	ug/L	0.346	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-60-5	trans-1,2-Dichloroethylene	ND		ug/L	0.279	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-02-6	trans-1,3-Dichloropropylene	ND		ug/L	0.229	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-01-6	**Trichloroethylene**	**0.350**		ug/L	0.249	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: TMW04_012926 **Sample ID:** 26A1279-04

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1279	170197605	Ground Water	January 29, 2026 1:18 pm	01/29/2026

VOA, 8260 LOW MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-69-4	Trichlorofluoromethane	ND	CCVE	ug/L	0.337	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-01-4	Vinyl Chloride	ND	CCVE	ug/L	0.469	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
1330-20-7	**Xylenes, Total**	**155**	B	ug/L	0.839	1.50	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:23	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: SURR: 1,2-Dichloroethane-d4*	*107 %*	*69-130*
2037-26-5	*Surrogate: SURR: Toluene-d8*	*100 %*	*81-117*
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*99.4 %*	*79-122*

Sample Information

Client Sample ID: GWDUP01_012926 **Sample ID:** 26A1279-05

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1279	170197605	Ground Water	January 29, 2026 12:00 am	01/29/2026

VOA, 8260 LOW MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND		ug/L	0.216	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-55-6	1,1,1-Trichloroethane	ND		ug/L	0.266	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-34-5	1,1,2,2-Tetrachloroethane	ND		ug/L	0.256	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	CCVE	ug/L	0.286	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-00-5	1,1,2-Trichloroethane	ND		ug/L	0.249	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-34-3	1,1-Dichloroethane	ND		ug/L	0.272	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-35-4	1,1-Dichloroethylene	ND		ug/L	0.327	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-61-6	1,2,3-Trichlorobenzene	ND		ug/L	0.222	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
96-18-4	1,2,3-Trichloropropane	ND		ug/L	0.273	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
120-82-1	**1,2,4-Trichlorobenzene**	**0.170**		ug/L	0.138	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
95-63-6	**1,2,4-Trimethylbenzene**	**19.7**	B	ug/L	0.310	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
96-12-8	1,2-Dibromo-3-chloropropane	ND		ug/L	0.432	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-93-4	1,2-Dibromoethane	ND		ug/L	0.215	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-50-1	1,2-Dichlorobenzene	ND		ug/L	0.270	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-06-2	1,2-Dichloroethane	ND		ug/L	0.377	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-87-5	1,2-Dichloropropane	ND		ug/L	0.327	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-67-8	**1,3,5-Trimethylbenzene**	**6.58**		ug/L	0.347	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
541-73-1	1,3-Dichlorobenzene	ND		ug/L	0.283	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-46-7	1,4-Dichlorobenzene	ND		ug/L	0.311	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-93-3	**2-Butanone**	**1.58**	QL-02	ug/L	0.421	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
591-78-6	2-Hexanone	ND	QL-02	ug/L	0.320	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: **GWDUP01_012926** **Sample ID:** **26A1279-05**

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1279	170197605	Ground Water	January 29, 2026 12:00 am	01/29/2026

VOA, 8260 LOW MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
108-10-1	**4-Methyl-2-pentanone**	**1.22**	QL-02	ug/L	0.365	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-64-1	**Acetone**	**10.9**	B	ug/L	1.34	2.00	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-02-8	Acrolein	ND		ug/L	0.447	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-13-1	**Acrylonitrile**	**9.80**		ug/L	0.422	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-43-2	**Benzene**	**25.2**		ug/L	0.279	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-97-5	Bromochloromethane	ND		ug/L	0.354	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
75-27-4	Bromodichloromethane	ND		ug/L	0.245	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-25-2	Bromoform	ND		ug/L	0.163	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-83-9	Bromomethane	ND	CCVE, QL-02	ug/L	0.500	2.00	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-15-0	Carbon disulfide	ND		ug/L	0.362	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
56-23-5	Carbon tetrachloride	ND		ug/L	0.204	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-90-7	Chlorobenzene	ND		ug/L	0.284	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-00-3	Chloroethane	ND		ug/L	0.448	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-66-3	Chloroform	ND		ug/L	0.243	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-87-3	Chloromethane	ND	CCVE	ug/L	0.372	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-59-2	cis-1,2-Dichloroethylene	ND		ug/L	0.294	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-01-5	cis-1,3-Dichloropropylene	ND		ug/L	0.262	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
110-82-7	**Cyclohexane**	**1.42**	CCVE	ug/L	0.491	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
124-48-1	Dibromochloromethane	ND		ug/L	0.146	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-95-3	Dibromomethane	ND		ug/L	0.203	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
75-71-8	Dichlorodifluoromethane	ND	CCVE	ug/L	0.451	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		

Sample Information

Client Sample ID: GWDUP01_012926 **Sample ID:** 26A1279-05

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1279	170197605	Ground Water	January 29, 2026 12:00 am	01/29/2026

VOA, 8260 LOW MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
100-41-4	**Ethyl Benzene**	**9.34**		ug/L	0.290	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-68-3	Hexachlorobutadiene	ND		ug/L	0.241	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	NYSDOH-NY12058,PADEP-68-04440		
98-82-8	**Isopropylbenzene**	**2.73**		ug/L	0.405	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-20-9	Methyl acetate	ND		ug/L	0.442	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
1634-04-4	**Methyl tert-butyl ether (MTBE)**	**74.4**	QL-02	ug/L	1.22	2.50	5	EPA 8260D	02/06/2026 11:26	02/10/2026 05:07	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-87-2	**Methylcyclohexane**	**2.18**	CCVE	ug/L	0.477	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
75-09-2	Methylene chloride	ND		ug/L	0.397	2.00	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
104-51-8	**n-Butylbenzene**	**0.400**		ug/L	0.399	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
103-65-1	**n-Propylbenzene**	**3.73**		ug/L	0.384	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-47-6	**o-Xylene**	**12.2**	B	ug/L	0.261	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
179601-23-1	**p- & m- Xylenes**	**25.6**	B	ug/L	0.578	1.00	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
99-87-6	**p-Isopropyltoluene**	**1.64**		ug/L	0.377	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
135-98-8	**sec-Butylbenzene**	**1.04**		ug/L	0.444	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
100-42-5	Styrene	ND		ug/L	0.255	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-65-0	**tert-Butyl alcohol (TBA)**	**1430**		ug/L	3.04	5.00	5	EPA 8260D	02/06/2026 11:26	02/10/2026 05:07	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
98-06-6	tert-Butylbenzene	ND		ug/L	0.367	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
127-18-4	Tetrachloroethylene	ND	CCVE, QL-02	ug/L	0.239	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-88-3	**Toluene**	**16.3**	B, CCVE, QL-02	ug/L	0.346	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-60-5	trans-1,2-Dichloroethylene	ND		ug/L	0.279	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-02-6	trans-1,3-Dichloropropylene	ND		ug/L	0.229	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-01-6	Trichloroethylene	ND		ug/L	0.249	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: GWDUP01_012926 **Sample ID:** 26A1279-05

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1279	170197605	Ground Water	January 29, 2026 12:00 am	01/29/2026

VOA, 8260 LOW MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-69-4	Trichlorofluoromethane	ND	CCVE	ug/L	0.337	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-01-4	Vinyl Chloride	ND	CCVE	ug/L	0.469	0.500	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
1330-20-7	**Xylenes, Total**	**37.8**	B	ug/L	0.839	1.50	1	EPA 8260D	02/06/2026 11:26	02/06/2026 18:54	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: SURR: 1,2-Dichloroethane-d4*	*99.6 %*	*69-130*
2037-26-5	*Surrogate: SURR: Toluene-d8*	*100 %*	*81-117*
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*97.1 %*	*79-122*

Analytical Batch Summary

Batch ID: BB60345 **Preparation Method:** EPA 5030B **Prepared By:** THD

Sample ID	Client Sample ID	Preparation Date
26A1279-01	TMW01_012926	02/06/26
26A1279-02	TMW02_012926	02/06/26
26A1279-03	TMW03_012926	02/06/26
26A1279-04	TMW04_012926	02/06/26
26A1279-05	GWDUP01_012926	02/06/26
BB60345-BLK1	Blank	02/06/26
BB60345-BS1	LCS	02/06/26
BB60345-BSD1	LCS Dup	02/06/26

Batch ID: BB60464 **Preparation Method:** EPA 5030B **Prepared By:** THD

Sample ID	Client Sample ID	Preparation Date
26A1279-01RE1	TMW01_012926	02/06/26
26A1279-03RE1	TMW03_012926	02/06/26
26A1279-04RE1	TMW04_012926	02/06/26
26A1279-05RE1	GWDUP01_012926	02/06/26
BB60464-BLK1	Blank	02/09/26
BB60464-BS1	LCS	02/09/26
BB60464-BSD1	LCS Dup	02/09/26

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60345 - EPA 5030B											
Blank (BB60345-BLK1) Blank									Prepared & Analyzed: 02/06/2026		
1,1,1,2-Tetrachloroethane	ND	0.500	ug/L								
1,1,1-Trichloroethane	ND	0.500	"								
1,1,2,2-Tetrachloroethane	ND	0.500	"								
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.500	"								
1,1,2-Trichloroethane	ND	0.500	"								
1,1-Dichloroethane	ND	0.500	"								
1,1-Dichloroethylene	ND	0.500	"								
1,2,3-Trichlorobenzene	ND	0.500	"								
1,2,3-Trichloropropane	ND	0.500	"								
1,2,4-Trichlorobenzene	ND	0.500	"								
1,2,4-Trimethylbenzene	0.320	0.500	"								
1,2-Dibromo-3-chloropropane	ND	0.500	"								
1,2-Dibromoethane	ND	0.500	"								
1,2-Dichlorobenzene	ND	0.500	"								
1,2-Dichloroethane	ND	0.500	"								
1,2-Dichloropropane	ND	0.500	"								
1,3,5-Trimethylbenzene	ND	0.500	"								
1,3-Dichlorobenzene	ND	0.500	"								
1,4-Dichlorobenzene	ND	0.500	"								
2-Butanone	ND	0.500	"								
2-Hexanone	ND	0.500	"								
4-Methyl-2-pentanone	ND	0.500	"								
Acetone	1.38	2.00	"								
Acrolein	ND	0.500	"								
Acrylonitrile	ND	0.500	"								
Benzene	ND	0.500	"								
Bromochloromethane	ND	0.500	"								
Bromodichloromethane	ND	0.500	"								
Bromoform	ND	0.500	"								
Bromomethane	ND	2.00	"								
Carbon disulfide	ND	0.500	"								
Carbon tetrachloride	ND	0.500	"								
Chlorobenzene	ND	0.500	"								
Chloroethane	ND	0.500	"								
Chloroform	ND	0.500	"								
Chloromethane	ND	0.500	"								
cis-1,2-Dichloroethylene	ND	0.500	"								
cis-1,3-Dichloropropylene	ND	0.500	"								
Cyclohexane	ND	0.500	"								
Dibromochloromethane	ND	0.500	"								
Dibromomethane	ND	0.500	"								
Dichlorodifluoromethane	ND	0.500	"								
Ethyl Benzene	ND	0.500	"								
Hexachlorobutadiene	0.270	0.500	"								
Isopropylbenzene	ND	0.500	"								
Methyl acetate	ND	0.500	"								
Methyl tert-butyl ether (MTBE)	ND	0.500	"								
Methylcyclohexane	ND	0.500	"								
Methylene chloride	ND	2.00	"								

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60345 - EPA 5030B											
Blank (BB60345-BLK1) Blank								Prepared & Analyzed: 02/06/2026			
n-Butylbenzene	ND	0.500	ug/L								
n-Propylbenzene	ND	0.500	"								
o-Xylene	0.420	0.500	"								
p- & m- Xylenes	0.790	1.00	"								
p-Isopropyltoluene	ND	0.500	"								
sec-Butylbenzene	ND	0.500	"								
Styrene	ND	0.500	"								
tert-Butyl alcohol (TBA)	ND	1.00	"								
tert-Butylbenzene	ND	0.500	"								
Tetrachloroethylene	ND	0.500	"								
Toluene	0.810	0.500	"								
trans-1,2-Dichloroethylene	ND	0.500	"								
trans-1,3-Dichloropropylene	ND	0.500	"								
Trichloroethylene	ND	0.500	"								
Trichlorofluoromethane	ND	0.500	"								
Vinyl Chloride	ND	0.500	"								
Xylenes, Total	1.21	1.50	"								
Surrogate: SURR: 1,2-Dichloroethane-d4	*10.5*		*"*	*10.0*		*105*	*69-130*				
Surrogate: SURR: Toluene-d8	*9.74*		*"*	*10.0*		*97.4*	*81-117*				
Surrogate: SURR: p-Bromofluorobenzene	*9.97*		*"*	*10.0*		*99.7*	*79-122*				
LCS (BB60345-BS1) LCS								Prepared & Analyzed: 02/06/2026			
1,1,1,2-Tetrachloroethane	9.81		ug/L	10.0		98.1	82-126				
1,1,1-Trichloroethane	10.8		"	10.0		108	78-136				
1,1,2,2-Tetrachloroethane	10.2		"	10.0		102	76-129				
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	10.1	0.500	"				54-165				
1,1,2-Trichloroethane	9.60		"	10.0		96.0	82-123				
1,1-Dichloroethane	10.5		"	10.0		105	82-129				
1,1-Dichloroethylene	9.80		"	10.0		98.0	68-138				
1,2,3-Trichlorobenzene	9.20		"	10.0		92.0	76-136				
1,2,3-Trichloropropane	9.75		"	10.0		97.5	77-128				
1,2,4-Trichlorobenzene	9.45		"	10.0		94.5	76-137				
1,2,4-Trimethylbenzene	10.8		"	10.0		108	82-132				
1,2-Dibromo-3-chloropropane	9.65		"	10.0		96.5	45-147				
1,2-Dibromoethane	9.97		"	10.0		99.7	83-124				
1,2-Dichlorobenzene	9.61		"	10.0		96.1	79-123				
1,2-Dichloroethane	9.63		"	10.0		96.3	73-132				
1,2-Dichloropropane	8.85		"	10.0		88.5	78-126				
1,3,5-Trimethylbenzene	10.2		"	10.0		102	80-131				
1,3-Dichlorobenzene	9.74		"	10.0		97.4	86-122				
1,4-Dichlorobenzene	9.87		"	10.0		98.7	85-124				
2-Butanone	9.47		"	20.0		47.4	49-152	Low Bias			
2-Hexanone	8.66		"	20.0		43.3	51-146	Low Bias			
4-Methyl-2-pentanone	8.91		"	20.0		44.6	57-145	Low Bias			
Acetone	8.04		"	20.0		40.2	14-150				
Acrolein	23.0		"	40.0		57.5	10-153				
Acrylonitrile	10.9		"	10.0		109	51-150				
Benzene	11.2		"	10.0		112	85-126				
Bromochloromethane	10.1		"	10.0		101	77-128				
Bromodichloromethane	9.13		"	10.0		91.3	79-128				

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60345 - EPA 5030B											
LCS (BB60345-BS1) LCS							Prepared & Analyzed: 02/06/2026				
Bromoform	10.4		ug/L	10.0		104	78-133				
Bromomethane	2.86		"	10.0		28.6	43-168	Low Bias			
Carbon disulfide	9.97		"	10.0		99.7	68-146				
Carbon tetrachloride	11.0		"	10.0		110	77-141				
Chlorobenzene	9.78		"	10.0		97.8	88-120				
Chloroethane	12.3		"	10.0		123	65-136				
Chloroform	10.2		"	10.0		102	82-128				
Chloromethane	7.24		"	10.0		72.4	43-155				
cis-1,2-Dichloroethylene	10.5		"	10.0		105	83-129				
cis-1,3-Dichloropropylene	9.46		"	10.0		94.6	80-131				
Cyclohexane	9.85		"	10.0		98.5	63-149				
Dibromochloromethane	10.2		"	10.0		102	80-130				
Dibromomethane	9.72		"	10.0		97.2	72-134				
Dichlorodifluoromethane	6.15		"	10.0		61.5	44-144				
Ethyl Benzene	10.5		"	10.0		105	80-131				
Hexachlorobutadiene	10.2		"	10.0		102	67-146				
Isopropylbenzene	10.5		"	10.0		105	76-140				
Methyl acetate	9.55		"	10.0		95.5	51-139				
Methyl tert-butyl ether (MTBE)	10.2		"	20.0		51.0	76-135	Low Bias			
Methylcyclohexane	9.62		"	10.0		96.2	72-143				
Methylene chloride	9.35		"	10.0		93.5	55-137				
n-Butylbenzene	9.49		"	10.0		94.9	79-132				
n-Propylbenzene	10.1		"	10.0		101	78-133				
o-Xylene	11.2		"	10.0		112	78-130				
p- & m- Xylenes	22.6		"	20.0		113	77-133				
p-Isopropyltoluene	10.4		"	10.0		104	81-136				
sec-Butylbenzene	10.2		"	10.0		102	79-137				
Styrene	9.60		"	10.0		96.0	67-132				
tert-Butyl alcohol (TBA)	54.5		"	50.0		109	25-162				
tert-Butylbenzene	10.1		"	10.0		101	77-138				
Tetrachloroethylene	5.56		"	10.0		55.6	82-131	Low Bias			
Toluene	13.5		"	10.0		135	80-127	High Bias			
trans-1,2-Dichloroethylene	10.3		"	10.0		103	80-132				
trans-1,3-Dichloropropylene	9.46		"	10.0		94.6	78-131				
Trichloroethylene	9.14		"	10.0		91.4	82-128				
Trichlorofluoromethane	9.95		"	10.0		99.5	67-139				
Vinyl Chloride	9.39		"	10.0		93.9	58-145				
Surrogate: SURR: 1,2-Dichloroethane-d4	*10.3*		*"*	*10.0*		*103*	*69-130*				
Surrogate: SURR: Toluene-d8	*9.81*		*"*	*10.0*		*98.1*	*81-117*				
Surrogate: SURR: p-Bromofluorobenzene	*9.92*		*"*	*10.0*		*99.2*	*79-122*				

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60345 - EPA 5030B											
LCS Dup (BB60345-BSD1) LCS Dup							Prepared & Analyzed: 02/06/2026				
1,1,1,2-Tetrachloroethane	9.65		ug/L	10.0		96.5	82-126		1.64	30	
1,1,1-Trichloroethane	9.93		"	10.0		99.3	78-136		8.58	30	
1,1,2,2-Tetrachloroethane	9.75		"	10.0		97.5	76-129		4.61	30	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	9.03	0.500	"				54-165		11.2	30	
1,1,2-Trichloroethane	9.60		"	10.0		96.0	82-123		0.00	30	
1,1-Dichloroethane	9.58		"	10.0		95.8	82-129		8.78	30	
1,1-Dichloroethylene	8.89		"	10.0		88.9	68-138		9.74	30	
1,2,3-Trichlorobenzene	9.59		"	10.0		95.9	76-136		4.15	30	
1,2,3-Trichloropropane	9.29		"	10.0		92.9	77-128		4.83	30	
1,2,4-Trichlorobenzene	9.28		"	10.0		92.8	76-137		1.82	30	
1,2,4-Trimethylbenzene	9.88		"	10.0		98.8	82-132		8.43	30	
1,2-Dibromo-3-chloropropane	10.0		"	10.0		100	45-147		3.96	30	
1,2-Dibromoethane	9.90		"	10.0		99.0	83-124		0.705	30	
1,2-Dichlorobenzene	9.47		"	10.0		94.7	79-123		1.47	30	
1,2-Dichloroethane	9.09		"	10.0		90.9	73-132		5.77	30	
1,2-Dichloropropane	8.73		"	10.0		87.3	78-126		1.37	30	
1,3,5-Trimethylbenzene	9.73		"	10.0		97.3	80-131		4.72	30	
1,3-Dichlorobenzene	9.25		"	10.0		92.5	86-122		5.16	30	
1,4-Dichlorobenzene	9.39		"	10.0		93.9	85-124		4.98	30	
2-Butanone	9.40		"	20.0		47.0	49-152	Low Bias	0.742	30	
2-Hexanone	8.81		"	20.0		44.0	51-146	Low Bias	1.72	30	
4-Methyl-2-pentanone	9.04		"	20.0		45.2	57-145	Low Bias	1.45	30	
Acetone	7.88		"	20.0		39.4	14-150		2.01	30	
Acrolein	21.3		"	40.0		53.2	10-153		7.73	30	
Acrylonitrile	10.6		"	10.0		106	51-150		2.50	30	
Benzene	9.85		"	10.0		98.5	85-126		13.1	30	
Bromochloromethane	9.38		"	10.0		93.8	77-128		7.00	30	
Bromodichloromethane	9.25		"	10.0		92.5	79-128		1.31	30	
Bromoform	10.2		"	10.0		102	78-133		2.04	30	
Bromomethane	2.88		"	10.0		28.8	43-168	Low Bias	0.697	30	
Carbon disulfide	9.01		"	10.0		90.1	68-146		10.1	30	
Carbon tetrachloride	10.0		"	10.0		100	77-141		9.51	30	
Chlorobenzene	9.50		"	10.0		95.0	88-120		2.90	30	
Chloroethane	11.7		"	10.0		117	65-136		5.08	30	
Chloroform	9.40		"	10.0		94.0	82-128		7.87	30	
Chloromethane	6.41		"	10.0		64.1	43-155		12.2	30	
cis-1,2-Dichloroethylene	9.60		"	10.0		96.0	83-129		9.33	30	
cis-1,3-Dichloropropylene	9.22		"	10.0		92.2	80-131		2.57	30	
Cyclohexane	8.82		"	10.0		88.2	63-149		11.0	30	
Dibromochloromethane	9.83		"	10.0		98.3	80-130		3.30	30	
Dibromomethane	9.29		"	10.0		92.9	72-134		4.52	30	
Dichlorodifluoromethane	5.73		"	10.0		57.3	44-144		7.07	30	
Ethyl Benzene	9.81		"	10.0		98.1	80-131		6.41	30	
Hexachlorobutadiene	9.25		"	10.0		92.5	67-146		9.47	30	
Isopropylbenzene	9.98		"	10.0		99.8	76-140		5.08	30	
Methyl acetate	9.02		"	10.0		90.2	51-139		5.71	30	
Methyl tert-butyl ether (MTBE)	9.34		"	20.0		46.7	76-135	Low Bias	8.90	30	
Methylcyclohexane	9.32		"	10.0		93.2	72-143		3.17	30	
Methylene chloride	8.34		"	10.0		83.4	55-137		11.4	30	
n-Butylbenzene	9.14		"	10.0		91.4	79-132		3.76	30	

Volatile Organic Compounds by GC/MS - Quality Control Data

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Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60345 - EPA 5030B											
LCS Dup (BB60345-BSD1) LCS Dup								Prepared & Analyzed: 02/06/2026			
n-Propylbenzene	9.47		ug/L	10.0		94.7	78-133		6.34	30	
o-Xylene	10.2		"	10.0		102	78-130		9.14	30	
p- & m- Xylenes	20.4		"	20.0		102	77-133		10.1	30	
p-Isopropyltoluene	9.85		"	10.0		98.5	81-136		5.24	30	
sec-Butylbenzene	9.61		"	10.0		96.1	79-137		5.47	30	
Styrene	9.56		"	10.0		95.6	67-132		0.418	30	
tert-Butyl alcohol (TBA)	47.9		"	50.0		95.8	25-162		12.8	30	
tert-Butylbenzene	9.70		"	10.0		97.0	77-138		4.34	30	
Tetrachloroethylene	5.47		"	10.0		54.7	82-131	Low Bias	1.63	30	
Toluene	11.0		"	10.0		110	80-127		20.3	30	
trans-1,2-Dichloroethylene	9.52		"	10.0		95.2	80-132		7.87	30	
trans-1,3-Dichloropropylene	9.35		"	10.0		93.5	78-131		1.17	30	
Trichloroethylene	8.88		"	10.0		88.8	82-128		2.89	30	
Trichlorofluoromethane	9.15		"	10.0		91.5	67-139		8.38	30	
Vinyl Chloride	8.46		"	10.0		84.6	58-145		10.4	30	
Surrogate: SURR: 1,2-Dichloroethane-d4	*10.0*		*"*	*10.0*		*100*	*69-130*				
Surrogate: SURR: Toluene-d8	*10.0*		*"*	*10.0*		*100*	*81-117*				
Surrogate: SURR: p-Bromofluorobenzene	*9.99*		*"*	*10.0*		*99.9*	*79-122*				
Batch BB60464 - EPA 5030B											
Blank (BB60464-BLK1) Blank								Prepared: 02/09/2026 Analyzed: 02/10/2026			
1,1,1,2-Tetrachloroethane	ND	0.500	ug/L								
1,1,1-Trichloroethane	ND	0.500	"								
1,1,2,2-Tetrachloroethane	ND	0.500	"								
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.500	"								
1,1,2-Trichloroethane	ND	0.500	"								
1,1-Dichloroethane	ND	0.500	"								
1,1-Dichloroethylene	ND	0.500	"								
1,2,3-Trichlorobenzene	ND	0.500	"								
1,2,3-Trichloropropane	ND	0.500	"								
1,2,4-Trichlorobenzene	ND	0.500	"								
1,2,4-Trimethylbenzene	ND	0.500	"								
1,2-Dibromo-3-chloropropane	ND	0.500	"								
1,2-Dibromoethane	ND	0.500	"								
1,2-Dichlorobenzene	ND	0.500	"								
1,2-Dichloroethane	ND	0.500	"								
1,2-Dichloropropane	ND	0.500	"								
1,3,5-Trimethylbenzene	ND	0.500	"								
1,3-Dichlorobenzene	ND	0.500	"								
1,4-Dichlorobenzene	ND	0.500	"								
2-Butanone	ND	0.500	"								
2-Hexanone	ND	0.500	"								
4-Methyl-2-pentanone	ND	0.500	"								
Acetone	ND	2.00	"								
Acrolein	ND	0.500	"								
Acrylonitrile	ND	0.500	"								
Benzene	ND	0.500	"								
Bromochloromethane	ND	0.500	"								
Bromodichloromethane	ND	0.500	"								
Bromoform	ND	0.500	"								

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Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60464 - EPA 5030B											
Blank (BB60464-BLK1) Blank									Prepared: 02/09/2026 Analyzed: 02/10/2026		
Bromomethane	ND	2.00	ug/L								
Carbon disulfide	ND	0.500	"								
Carbon tetrachloride	ND	0.500	"								
Chlorobenzene	ND	0.500	"								
Chloroethane	ND	0.500	"								
Chloroform	ND	0.500	"								
Chloromethane	ND	0.500	"								
cis-1,2-Dichloroethylene	ND	0.500	"								
cis-1,3-Dichloropropylene	ND	0.500	"								
Cyclohexane	ND	0.500	"								
Dibromochloromethane	ND	0.500	"								
Dibromomethane	ND	0.500	"								
Dichlorodifluoromethane	ND	0.500	"								
Ethyl Benzene	ND	0.500	"								
Hexachlorobutadiene	ND	0.500	"								
Isopropylbenzene	ND	0.500	"								
Methyl acetate	ND	0.500	"								
Methyl tert-butyl ether (MTBE)	ND	0.500	"								
Methylcyclohexane	ND	0.500	"								
Methylene chloride	ND	2.00	"								
n-Butylbenzene	ND	0.500	"								
n-Propylbenzene	ND	0.500	"								
o-Xylene	ND	0.500	"								
p- & m- Xylenes	ND	1.00	"								
p-Isopropyltoluene	ND	0.500	"								
sec-Butylbenzene	ND	0.500	"								
Styrene	ND	0.500	"								
tert-Butyl alcohol (TBA)	ND	1.00	"								
tert-Butylbenzene	ND	0.500	"								
Tetrachloroethylene	ND	0.500	"								
Toluene	ND	0.500	"								
trans-1,2-Dichloroethylene	ND	0.500	"								
trans-1,3-Dichloropropylene	ND	0.500	"								
Trichloroethylene	ND	0.500	"								
Trichlorofluoromethane	ND	0.500	"								
Vinyl Chloride	ND	0.500	"								
Xylenes, Total	ND	1.50	"								
Surrogate: SURR: 1,2-Dichloroethane-d4	*10.6*		*"*	*10.0*		*106*	*69-130*				
Surrogate: SURR: Toluene-d8	*9.88*		*"*	*10.0*		*98.8*	*81-117*				
Surrogate: SURR: p-Bromofluorobenzene	*10.4*		*"*	*10.0*		*104*	*79-122*				

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60464 - EPA 5030B											
LCS (BB60464-BS1) LCS							Prepared & Analyzed: 02/09/2026				
1,1,1,2-Tetrachloroethane	10.2		ug/L	10.0		102	82-126				
1,1,1-Trichloroethane	11.0		"	10.0		110	78-136				
1,1,2,2-Tetrachloroethane	9.95		"	10.0		99.5	76-129				
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	9.83	0.500	"				54-165				
1,1,2-Trichloroethane	9.85		"	10.0		98.5	82-123				
1,1-Dichloroethane	10.4		"	10.0		104	82-129				
1,1-Dichloroethylene	9.92		"	10.0		99.2	68-138				
1,2,3-Trichlorobenzene	8.04		"	10.0		80.4	76-136				
1,2,3-Trichloropropane	9.24		"	10.0		92.4	77-128				
1,2,4-Trichlorobenzene	8.47		"	10.0		84.7	76-137				
1,2,4-Trimethylbenzene	9.77		"	10.0		97.7	82-132				
1,2-Dibromo-3-chloropropane	9.29		"	10.0		92.9	45-147				
1,2-Dibromoethane	10.2		"	10.0		102	83-124				
1,2-Dichlorobenzene	9.22		"	10.0		92.2	79-123				
1,2-Dichloroethane	9.95		"	10.0		99.5	73-132				
1,2-Dichloropropane	9.03		"	10.0		90.3	78-126				
1,3,5-Trimethylbenzene	9.84		"	10.0		98.4	80-131				
1,3-Dichlorobenzene	9.34		"	10.0		93.4	86-122				
1,4-Dichlorobenzene	9.38		"	10.0		93.8	85-124				
2-Butanone	9.01		"	20.0		45.0	49-152	Low Bias			
2-Hexanone	8.58		"	20.0		42.9	51-146	Low Bias			
4-Methyl-2-pentanone	8.99		"	20.0		45.0	57-145	Low Bias			
Acetone	7.68		"	20.0		38.4	14-150				
Acrolein	23.3		"	40.0		58.2	10-153				
Acrylonitrile	10.9		"	10.0		109	51-150				
Benzene	10.7		"	10.0		107	85-126				
Bromochloromethane	10.1		"	10.0		101	77-128				
Bromodichloromethane	9.72		"	10.0		97.2	79-128				
Bromoform	10.3		"	10.0		103	78-133				
Bromomethane	5.00		"	10.0		50.0	43-168				
Carbon disulfide	9.34		"	10.0		93.4	68-146				
Carbon tetrachloride	11.1		"	10.0		111	77-141				
Chlorobenzene	9.86		"	10.0		98.6	88-120				
Chloroethane	12.0		"	10.0		120	65-136				
Chloroform	10.3		"	10.0		103	82-128				
Chloromethane	6.89		"	10.0		68.9	43-155				
cis-1,2-Dichloroethylene	10.4		"	10.0		104	83-129				
cis-1,3-Dichloropropylene	9.71		"	10.0		97.1	80-131				
Cyclohexane	9.77		"	10.0		97.7	63-149				
Dibromochloromethane	10.1		"	10.0		101	80-130				
Dibromomethane	9.74		"	10.0		97.4	72-134				
Dichlorodifluoromethane	4.59		"	10.0		45.9	44-144				
Ethyl Benzene	9.98		"	10.0		99.8	80-131				
Hexachlorobutadiene	8.99		"	10.0		89.9	67-146				
Isopropylbenzene	10.4		"	10.0		104	76-140				
Methyl acetate	9.56		"	10.0		95.6	51-139				
Methyl tert-butyl ether (MTBE)	9.71		"	20.0		48.6	76-135	Low Bias			
Methylcyclohexane	9.24		"	10.0		92.4	72-143				
Methylene chloride	9.54		"	10.0		95.4	55-137				
n-Butylbenzene	9.18		"	10.0		91.8	79-132				

Volatile Organic Compounds by GC/MS - Quality Control Data

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Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60464 - EPA 5030B											
LCS (BB60464-BS1) LCS								Prepared & Analyzed: 02/09/2026			
n-Propylbenzene	9.88		ug/L	10.0		98.8	78-133				
o-Xylene	9.97		"	10.0		99.7	78-130				
p- & m- Xylenes	20.0		"	20.0		100	77-133				
p-Isopropyltoluene	9.86		"	10.0		98.6	81-136				
sec-Butylbenzene	9.77		"	10.0		97.7	79-137				
Styrene	9.92		"	10.0		99.2	67-132				
tert-Butyl alcohol (TBA)	48.2		"	50.0		96.3	25-162				
tert-Butylbenzene	9.84		"	10.0		98.4	77-138				
Tetrachloroethylene	5.71		"	10.0		57.1	82-131	Low Bias			
Toluene	10.1		"	10.0		101	80-127				
trans-1,2-Dichloroethylene	10.4		"	10.0		104	80-132				
trans-1,3-Dichloropropylene	9.87		"	10.0		98.7	78-131				
Trichloroethylene	9.43		"	10.0		94.3	82-128				
Trichlorofluoromethane	9.94		"	10.0		99.4	67-139				
Vinyl Chloride	9.00		"	10.0		90.0	58-145				
Surrogate: SURR: 1,2-Dichloroethane-d4	*10.2*		*"*	*10.0*		*102*	*69-130*				
Surrogate: SURR: Toluene-d8	*10.0*		*"*	*10.0*		*100*	*81-117*				
Surrogate: SURR: p-Bromofluorobenzene	*10.0*		*"*	*10.0*		*100*	*79-122*				
LCS Dup (BB60464-BSD1) LCS Dup								Prepared: 02/09/2026 Analyzed: 02/10/2026			
1,1,1,2-Tetrachloroethane	10.6		ug/L	10.0		106	82-126		3.96	30	
1,1,1-Trichloroethane	10.3		"	10.0		103	78-136		6.40	30	
1,1,2,2-Tetrachloroethane	10.4		"	10.0		104	76-129		3.94	30	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	8.73	0.500	"				54-165		11.9	30	
1,1,2-Trichloroethane	10.1		"	10.0		101	82-123		2.51	30	
1,1-Dichloroethane	10.2		"	10.0		102	82-129		2.24	30	
1,1-Dichloroethylene	8.65		"	10.0		86.5	68-138		13.7	30	
1,2,3-Trichlorobenzene	7.97		"	10.0		79.7	76-136		0.874	30	
1,2,3-Trichloropropane	9.90		"	10.0		99.0	77-128		6.90	30	
1,2,4-Trichlorobenzene	8.53		"	10.0		85.3	76-137		0.706	30	
1,2,4-Trimethylbenzene	9.40		"	10.0		94.0	82-132		3.86	30	
1,2-Dibromo-3-chloropropane	9.95		"	10.0		99.5	45-147		6.86	30	
1,2-Dibromoethane	10.1		"	10.0		101	83-124		0.986	30	
1,2-Dichlorobenzene	9.43		"	10.0		94.3	79-123		2.25	30	
1,2-Dichloroethane	9.72		"	10.0		97.2	73-132		2.34	30	
1,2-Dichloropropane	9.40		"	10.0		94.0	78-126		4.02	30	
1,3,5-Trimethylbenzene	9.64		"	10.0		96.4	80-131		2.05	30	
1,3-Dichlorobenzene	9.53		"	10.0		95.3	86-122		2.01	30	
1,4-Dichlorobenzene	9.37		"	10.0		93.7	85-124		0.107	30	
2-Butanone	9.01		"	20.0		45.0	49-152	Low Bias	0.00	30	
2-Hexanone	8.73		"	20.0		43.6	51-146	Low Bias	1.73	30	
4-Methyl-2-pentanone	7.95		"	20.0		39.8	57-145	Low Bias	12.3	30	
Acetone	7.49		"	20.0		37.4	14-150		2.50	30	
Acrolein	23.0		"	40.0		57.6	10-153		1.17	30	
Acrylonitrile	10.7		"	10.0		107	51-150		1.95	30	
Benzene	10.2		"	10.0		102	85-126		4.98	30	
Bromochloromethane	9.92		"	10.0		99.2	77-128		1.60	30	
Bromodichloromethane	9.84		"	10.0		98.4	79-128		1.23	30	
Bromoform	10.3		"	10.0		103	78-133		0.0972	30	
Bromomethane	5.23		"	10.0		52.3	43-168		4.50	30	

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60464 - EPA 5030B											
LCS Dup (BB60464-BSD1) LCS Dup									Prepared: 02/09/2026 Analyzed: 02/10/2026		
Carbon disulfide	8.72		ug/L	10.0		87.2	68-146		6.87	30	
Carbon tetrachloride	10.1		"	10.0		101	77-141		9.81	30	
Chlorobenzene	9.98		"	10.0		99.8	88-120		1.21	30	
Chloroethane	10.3		"	10.0		103	65-136		15.2	30	
Chloroform	9.71		"	10.0		97.1	82-128		6.19	30	
Chloromethane	6.68		"	10.0		66.8	43-155		3.10	30	
cis-1,2-Dichloroethylene	9.75		"	10.0		97.5	83-129		6.16	30	
cis-1,3-Dichloropropylene	9.82		"	10.0		98.2	80-131		1.13	30	
Cyclohexane	8.65		"	10.0		86.5	63-149		12.2	30	
Dibromochloromethane	10.4		"	10.0		104	80-130		2.93	30	
Dibromomethane	9.78		"	10.0		97.8	72-134		0.410	30	
Dichlorodifluoromethane	4.14		"	10.0		41.4	44-144	Low Bias	10.3	30	
Ethyl Benzene	9.89		"	10.0		98.9	80-131		0.906	30	
Hexachlorobutadiene	9.00		"	10.0		90.0	67-146		0.111	30	
Isopropylbenzene	10.1		"	10.0		101	76-140		2.53	30	
Methyl acetate	9.17		"	10.0		91.7	51-139		4.16	30	
Methyl tert-butyl ether (MTBE)	9.63		"	20.0		48.2	76-135	Low Bias	0.827	30	
Methylcyclohexane	8.14		"	10.0		81.4	72-143		12.7	30	
Methylene chloride	9.32		"	10.0		93.2	55-137		2.33	30	
n-Butylbenzene	8.75		"	10.0		87.5	79-132		4.80	30	
n-Propylbenzene	9.45		"	10.0		94.5	78-133		4.45	30	
o-Xylene	9.96		"	10.0		99.6	78-130		0.100	30	
p- & m- Xylenes	19.9		"	20.0		99.4	77-133		0.851	30	
p-Isopropyltoluene	9.40		"	10.0		94.0	81-136		4.78	30	
sec-Butylbenzene	9.15		"	10.0		91.5	79-137		6.55	30	
Styrene	9.96		"	10.0		99.6	67-132		0.402	30	
tert-Butyl alcohol (TBA)	47.8		"	50.0		95.6	25-162		0.792	30	
tert-Butylbenzene	9.35		"	10.0		93.5	77-138		5.11	30	
Tetrachloroethylene	5.38		"	10.0		53.8	82-131	Low Bias	5.95	30	
Toluene	10.1		"	10.0		101	80-127		0.397	30	
trans-1,2-Dichloroethylene	9.91		"	10.0		99.1	80-132		5.21	30	
trans-1,3-Dichloropropylene	9.96		"	10.0		99.6	78-131		0.908	30	
Trichloroethylene	9.32		"	10.0		93.2	82-128		1.17	30	
Trichlorofluoromethane	8.74		"	10.0		87.4	67-139		12.8	30	
Vinyl Chloride	7.74		"	10.0		77.4	58-145		15.1	30	
Surrogate: SURR: 1,2-Dichloroethane-d4	*9.85*		*"*	*10.0*		*98.5*	*69-130*				
Surrogate: SURR: Toluene-d8	*10.1*		*"*	*10.0*		*101*	*81-117*				
Surrogate: SURR: p-Bromofluorobenzene	*10.2*		*"*	*10.0*		*102*	*79-122*				

Volatile Analysis Sample Containers

Lab ID	Client Sample ID	Volatile Sample Container
26A1279-01	TMW01_012926	40mL Clear Vial (pre-pres.) HCl; Cool to 4° C
26A1279-02	TMW02_012926	40mL Clear Vial (pre-pres.) HCl; Cool to 4° C
26A1279-03	TMW03_012926	40mL Clear Vial (pre-pres.) HCl; Cool to 4° C
26A1279-04	TMW04_012926	40mL Clear Vial (pre-pres.) HCl; Cool to 4° C
26A1279-05	GWDUP01_012926	40mL Clear Vial (pre-pres.) HCl; Cool to 4° C

Sample and Data Qualifiers Relating to This Work Order

QL-02	This LCS analyte is outside Laboratory Recovery limits due the analyte behavior using the referenced method. The reference method has certain limitations with respect to analytes of this nature.
CCVE	The value reported is ESTIMATED. The value is estimated due to its behavior during continuing calibration verification (>20% Difference for average Rf or >20% Drift for quadratic fit).
B	Analyte is found in the associated analysis batch blank. For volatiles, methylene chloride and acetone are common lab contaminants.
/\	Analyte is not certified but the state of sample origination offer certification for the Analyte

Definitions and Other Explanations

*	Analyte is not certified or the state of the samples origination does not offer certification for the Analyte.
ND	NOT DETECTED - the analyte is not detected at the Reported to level (LOQ/RL or LOD/MDL)
RL	REPORTING LIMIT - the minimum reportable value based upon the lowest point in the analyte calibration curve.
LOQ	LIMIT OF QUANTITATION - the minimum concentration of a target analyte that can be reported within a specified degree of confidence. This is the lowest point in an analyte calibration curve that has been subjected to all steps of the processing/analysis and verified to meet defined criteria. This is based upon NELAC 2009 Standards and applies to all analyses.
LOD	LIMIT OF DETECTION - a verified estimate of the minimum concentration of a substance in a given matrix that an analytical process can reliably detect. This is based upon NELAC 2009 Standards and applies to all analyses conducted under the auspices of EPA SW-846.
MDL	METHOD DETECTION LIMIT - a statistically derived estimate of the minimum amount of a substance an analytical system can reliably detect with a 99% confidence that the concentration of the substance is greater than zero. This is based upon 40 CFR Part 136 Appendix B and applies only to EPA 600 and 200 series methods.
Reported to	This indicates that the data for a particular analysis is reported to either the LOD/MDL, or the LOQ/RL. In cases where the "Reported to" is located above the LOD/MDL, any value between this and the LOQ represents an estimated value which is "J" flagged accordingly. This applies to volatile and semi-volatile target compounds only.
NR	Not reported
RPD	Relative Percent Difference
Wet	The data has been reported on an as-received (wet weight) basis
Low Bias	Low Bias flag indicates that the recovery of the flagged analyte is below the laboratory or regulatory lower control limit. The data user should take note that this analyte may be biased low but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
High Bias	High Bias flag indicates that the recovery of the flagged analyte is above the laboratory or regulatory upper control limit. The data user should take note that this analyte may be biased high but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
Non-Dir.	Non-dir. flag (Non-Directional Bias) indicates that the Relative Percent Difference (RPD) (a measure of precision) among the MS and MSD data is outside the laboratory or regulatory control limit. This alerts the data user where the MS and MSD are from site-specific samples that the RPD is high due to either non-homogeneous distribution of target analyte between the MS/MSD or indicates poor reproducibility for other reasons.

If EPA SW-846 method 8270 is included herein it is noted that the target compound N-nitrosodiphenylamine (NDPA) decomposes in the gas chromatographic inlet and cannot be separated from diphenylamine (DPA). These results could actually represent 100% DPA, 100% NDPA or some combination of the two. For this reason, ALS reports the combined result for n-nitrosodiphenylamine and diphenylamine for either of these compounds as a combined concentration as Diphenylamine.

If Total PCBs are detected and the target aroclors reported are "Not detected", the Total PCB value is reported due to the presence of either or both Aroclors 1262 and 1268 which are non-target aroclors for some regulatory lists.

2-chloroethylvinyl ether readily breaks down under acidic conditions. Samples that are acid preserved, including standards will exhibit breakdown. The data user should take note.

Certification for pH is no longer offered by NYDOH ELAP.

Semi-Volatile and Volatile analyses are reported down to the LOD/MDL, with values between the LOD/MDL and the LOQ being "J" flagged as estimated results.

For analyses by EPA SW-846-8270D, the Limit of Quantitation (LOQ) reported for benzidine is based upon the lowest standard used for calibration and is not a verified LOQ due to this compound's propensity for oxidative losses during extraction/concentration procedures and non-reproducible chromatographic performance.

Corrective Action: No sample containers received for sample TP01_012926. Client notified on 1/30/26

Field Chain-of-Custody Record

USA environmental

ALS' Standard Terms & Conditions are listed on the back side of this document. This legal document serves as your written authorization for ALS to proceed with the analyses requested below. Your signature binds you to ALS' Standard Terms & Conditions.

120 Research Drive Stratford, CT 06615 132-02 89th Ave Queens, NY 11418 56 Church Hill Rd. #2 Newtown, CT 06470 2161 Whitesville Rd Toms River, NJ 08755 clientservices@yorklab.com 800-306-YORK 800-306-9675

ALS Project Number: 26A1279

Page 1 of 8

Report To:	Invoice To:
Company: LANGAN NYC	Company:
Address: 348 Ninth Ave, 8th floor New York, NY 10001	Address: SAME
Phone.: 212-479-5400	Phone.:
Contact: Ellie Seery	Contact:
E-mail: ESEERY@LANGAN.COM	E-mail:

YOUR Project Name / Number: Willets Point Development L-parcel 1701976.05

PO Number:

Samples Collected From: NY X | CT | NJ | PA | Other: (please specify)

Please print clearly and legibly. All information must be complete. Samples will not be logged in and the turn-around-time clock will not begin until any questions by ALS are resolved.

Samples Collected by: (print AND sign your name) Logan Clements

Matrix Codes: S - soil/solid/sludge; GW - groundwater; DW - drinking water; SW - surface water; WW - wastewater; O - Oil; Other

Preservative (please list number of containers)

Analyses Requested

Sample Identification	Date	Time	Matrix	Unpreserved	HCl (hydrochloric acid)	MeOH (methanol)	HNO_3 (nitric acid)	H_2SO_4 (sulfuric acid)	NaOH (sodium hydroxide)	$Na_2S_2O_3$ (sodium thio.)	Trizma	Ammonium Acetate	Other: Part 375 TCL VOCs	Grab or Comp. G/C
TMW01-012926	1/29	1055	GW		X									
TMW02-012926		1422												
TMW03-012926		1215												
TMW04-012926		1318												
GWDUP01-012926		—												
TP01-012926		—												

Turn-Around Time: RUSH - Next Day; RUSH - Two Day; RUSH - Three Day; RUSH - Four Day; RUSH - Five Day; Standard (6-9 Day) X; PFAS Standard 7-10 Day

Report Type (circle): QA Report; Summary (Results Only); NY ASP B Package; NJ Reduced; NJ DKQP; NJ Full; CT RCP

EDD Type (circle): EQuIS (standard); NYSDEC EQuIS; NJDEP SRP Haz Site; Standard Excel; CMDP; Other:

Regulatory Comparative: Compared to the following Regulation(s): (please fill in)

Field Filtered

Lab Filtered

Comments: Please cc: ESEERY@Langan.com, BBURGESS@Langan.com, LCLEMENTS@Langan.com on all deliverables & DATAMANAGEMENT@Langan.com

Samples iced/chilled at time of lab pickup? circle Yes or No

Lab Sample Receiving Checklist (to be completed by the receiving laboratory only) Circle Y / N

Custody Seals: Y / N Containers Intact: Y / N COC/Labels Agree: Y / N Preservation Confirmed: Y / N

COC Complete: Y / N COC Received: Y / N Appropriate Sample Volumes: Y / N Appropriate Sample Containers: Y / N

Cooler Temperature Confirmed: Y / N Samples Submitted within Holding Times: Y / N Corrective Action Form Required: Y / N

1. Samples Relinquished by / Company	Date/Time	1. Samples Received by / Company	Date/Time	2. Samples Relinquished by / Company	Date/Time
Logan Clements/Langan	1/29/26 @ 15:11		1/29/26 1515		1/29/26 16:05
2. Samples Received by / Company	Date/Time	3. Samples Relinquished by / Company	Date/Time	3. Samples Received by / Company	Date/Time
	1/29/26 16:05 4.9		1/29/26		1-29-26 18:00
4. Samples Relinquished by / Company	Date/Time	4. Samples Received by / Company	Date/Time	Samples Received in LAB by	Date/Time / Temperature
	1-29-26 20:00				1/29/26 20:00 3.6 Degrees C

Technical Report

prepared for:

Langan Engineering & Environmental Services (NYC)
21 Penn Plaza, 360 West 31st Street
New York NY, 10001
Attention: Ellie Seery

Report Date: 02/10/2026
Client Project ID: 170197605
Project (SDG) No.: 26A1278

120 RESEARCH DRIVE STRATFORD, CT 06615 132-02 89th AVENUE RICHMOND HILL, NY 11418
www.alsglobal.com/usaenviro (203) 325-1371 FAX (203) 357-0166 nastr.clientservices@alsglobal.com

Report Date: 02/10/2026
Client Project ID: 170197605
Project (SDG) No.: 26A1278

Langan Engineering & Environmental Services (NYC)
21 Penn Plaza, 360 West 31st Street
New York NY, 10001
Attention: Ellie Seery

Purpose and Results

This report contains the analytical data for the sample(s) identified on the attached chain-of-custody received in our laboratory on January 29, 2026 and listed below. The project was identified as your project: **170197605**.

The analyses were conducted utilizing appropriate EPA, Standard Methods, and ASTM methods as detailed in the data summary tables.

All samples were received in proper condition meeting the customary acceptance requirements for environmental samples except those indicated under the Sample and Analysis Qualifiers section of this report.

All analyses met the method and laboratory standard operating procedure requirements except as indicated by any data flags, the meaning of which are explained in the Sample and Data Qualifiers Relating to This Work Order section of this report and case narrative if applicable.

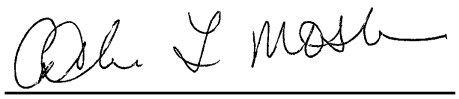
The results of the analyses, which are all reported on dry weight basis (soils) unless otherwise noted, are detailed in the following pages.

Please contact Client Services at 203.325.1371 with any questions regarding this report.

Sample ID	Client Sample ID	Matrix	Date Collected	Date Received
26A1278-01	TS03_EL_1-3	Soil	01/29/2026	01/29/2026
26A1278-02	TS02_EL_1-3	Soil	01/29/2026	01/29/2026
26A1278-03	TS01_EL_4-6	Soil	01/29/2026	01/29/2026

General Notes for Project (SDG) No.: 26A1278

1. The RLs and MDLs (Reporting Limit and Method Detection Limit respectively) reported are adjusted for any dilution necessary due to the levels of target and/or non-target analytes and matrix interference. The RL(REPORTING LIMIT) is based upon the lowest standard utilized for the calibration where applicable.
2. Samples are retained for a period of thirty days after submittal of report, unless other arrangements are made.
3. ALS' liability for the above data is limited to the dollar value paid to ALS for the referenced project.
4. This report shall not be reproduced without the written approval of ALS, Inc.
5. All analyses conducted met method or Laboratory SOP requirements. See the Sample and Data Qualifiers Section for further information.
6. It is noted that no analyses reported herein were subcontracted to another laboratory, unless noted in the report.
7. This report reflects results that relate only to the samples submitted on the attached chain-of-custody form(s) received by ALS.
8. Analyses conducted at ALS, Inc. Stratford, CT are indicated by NY Cert. No. 10854; those conducted at ALS, Inc., Richmond Hill, NY are indicated by NY Cert. No. 12058.

Approved By: 

Date: 02/10/2026

Cassie Mosher
Laboratory Manager - Stratford

Sample Information

Client Sample ID: TS03_EL_1-3 **Sample ID:** 26A1278-01

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1278	170197605	Soil	January 29, 2026 8:50 am	01/29/2026

VOA, 8260 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-55-6	1,1,1-Trichloroethane	ND		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-34-5	1,1,2,2-Tetrachloroethane	ND		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-00-5	1,1,2-Trichloroethane	ND		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-34-3	1,1-Dichloroethane	ND		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-35-4	1,1-Dichloroethylene	ND		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-61-6	1,2,3-Trichlorobenzene	ND		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
96-18-4	1,2,3-Trichloropropane	ND		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
120-82-1	1,2,4-Trichlorobenzene	ND		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
95-63-6	**1,2,4-Trimethylbenzene**	**140**		mg/kg dry	2.6	5.3	1000	EPA 8260D	02/05/2026 13:00	02/10/2026 09:54	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
96-12-8	1,2-Dibromo-3-chloropropane	ND	QL-02	mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-93-4	1,2-Dibromoethane	ND		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-50-1	1,2-Dichlorobenzene	ND		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-06-2	1,2-Dichloroethane	ND		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-87-5	1,2-Dichloropropane	ND		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-67-8	**1,3,5-Trimethylbenzene**	**39**		mg/kg dry	0.26	0.53	100	EPA 8260D	02/05/2026 13:00	02/07/2026 04:15	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
541-73-1	1,3-Dichlorobenzene	ND		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-46-7	1,4-Dichlorobenzene	ND		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-93-3	2-Butanone	ND	QL-02	mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: TS03_EL_1-3 **Sample ID:** 26A1278-01

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1278	170197605	Soil	January 29, 2026 8:50 am	01/29/2026

VOA, 8260 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
591-78-6	2-Hexanone	ND	QL-02	mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-10-1	4-Methyl-2-pentanone	ND	QL-02	mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-64-1	**Acetone**	**0.13**		mg/kg dry	0.0063	0.013	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-02-8	Acrolein	ND		mg/kg dry	0.0063	0.013	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-13-1	Acrylonitrile	ND		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-43-2	**Benzene**	**7.5**		mg/kg dry	0.26	0.53	100	EPA 8260D	02/05/2026 13:00	02/07/2026 04:15	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-97-5	Bromochloromethane	ND		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
75-27-4	Bromodichloromethane	ND		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-25-2	Bromoform	ND	QL-02	mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-83-9	Bromomethane	ND		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-15-0	**Carbon disulfide**	**0.011**		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
56-23-5	Carbon tetrachloride	ND		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-90-7	Chlorobenzene	ND		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-00-3	Chloroethane	ND		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-66-3	Chloroform	ND		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-87-3	Chloromethane	ND		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-59-2	cis-1,2-Dichloroethylene	ND		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-01-5	cis-1,3-Dichloropropylene	ND		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
110-82-7	**Cyclohexane**	**13**		mg/kg dry	0.26	0.53	100	EPA 8260D	02/05/2026 13:00	02/07/2026 04:15	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
124-48-1	Dibromochloromethane	ND		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
74-95-3	Dibromomethane	ND		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		

Sample Information

Client Sample ID: TS03_EL_1-3 **Sample ID:** 26A1278-01

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1278	170197605	Soil	January 29, 2026 8:50 am	01/29/2026

VOA, 8260 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-71-8	Dichlorodifluoromethane	ND	CCVE	mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
100-41-4	**Ethyl Benzene**	**36**		mg/kg dry	0.26	0.53	100	EPA 8260D	02/05/2026 13:00	02/07/2026 04:15	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-68-3	Hexachlorobutadiene	ND		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
98-82-8	**Isopropylbenzene**	**0.12**		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-20-9	Methyl acetate	ND		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
1634-04-4	Methyl tert-butyl ether (MTBE)	ND	QL-02	mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-87-2	**Methylcyclohexane**	**0.43**		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
75-09-2	Methylene chloride	ND		mg/kg dry	0.0063	0.013	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NJDEP-CT005,PADEP-68-0		
104-51-8	**n-Butylbenzene**	**0.055**		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
103-65-1	**n-Propylbenzene**	**0.32**		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-47-6	**o-Xylene**	**70**		mg/kg dry	0.53	1.1	200	EPA 8260D	02/05/2026 13:00	02/07/2026 04:42	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
179601-23-1	**p- & m- Xylenes**	**170**		mg/kg dry	1.1	2.1	200	EPA 8260D	02/05/2026 13:00	02/07/2026 04:42	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
99-87-6	**p-Isopropyltoluene**	**0.026**		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
135-98-8	**sec-Butylbenzene**	**0.035**		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
100-42-5	**Styrene**	**0.14**		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-65-0	tert-Butyl alcohol (TBA)	ND		mg/kg dry	0.016	0.032	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
98-06-6	tert-Butylbenzene	ND		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
127-18-4	Tetrachloroethylene	ND		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-88-3	**Toluene**	**75**		mg/kg dry	2.6	5.3	1000	EPA 8260D	02/05/2026 13:00	02/10/2026 09:54	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-60-5	trans-1,2-Dichloroethylene	ND		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-02-6	trans-1,3-Dichloropropylene	ND		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: TS03_EL_1-3 **Sample ID:** 26A1278-01

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1278	170197605	Soil	January 29, 2026 8:50 am	01/29/2026

VOA, 8260 MASTER

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
79-01-6	Trichloroethylene	ND		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-69-4	Trichlorofluoromethane	ND		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-01-4	Vinyl Chloride	ND		mg/kg dry	0.0032	0.0063	1	EPA 8260D	02/05/2026 13:00	02/06/2026 01:35	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
1330-20-7	**Xylenes, Total**	**240**		mg/kg dry	1.6	3.2	200	EPA 8260D	02/05/2026 13:00	02/07/2026 04:42	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: SURR: 1,2-Dichloroethane-d4*	*115 %*	*77-125*
2037-26-5	*Surrogate: SURR: Toluene-d8*	*104 %*	*85-120*
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*118 %*	*76-130*

SVOA, 8270 MASTER

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3546 SVOA

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
92-52-4	1,1-Biphenyl	ND		mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		mg/kg dry	0.102	0.203	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
122-66-7	1,2-Diphenylhydrazine (as Azobenzene)	ND	CCVE	mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
58-90-2	2,3,4,6-Tetrachlorophenol	ND		mg/kg dry	0.102	0.203	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
95-95-4	2,4,5-Trichlorophenol	ND		mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
88-06-2	2,4,6-Trichlorophenol	ND		mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
120-83-2	2,4-Dichlorophenol	ND		mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
105-67-9	2,4-Dimethylphenol	ND		mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
51-28-5	2,4-Dinitrophenol	ND		mg/kg dry	0.102	0.203	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
121-14-2	2,4-Dinitrotoluene	ND		mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
606-20-2	2,6-Dinitrotoluene	ND		mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
91-58-7	2-Chloronaphthalene	ND		mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		

Sample Information

Client Sample ID: TS03_EL_1-3 **Sample ID:** 26A1278-01

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1278	170197605	Soil	January 29, 2026 8:50 am	01/29/2026

SVOA, 8270 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3546 SVOA

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
95-57-8	2-Chlorophenol	ND		mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
91-57-6	**2-Methylnaphthalene**	**1.35**		mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
95-48-7	2-Methylphenol	ND		mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
88-74-4	2-Nitroaniline	ND		mg/kg dry	0.102	0.203	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
88-75-5	2-Nitrophenol	ND		mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
65794-96-9	* 3- & 4-Methylphenols	ND		mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840		
91-94-1	3,3-Dichlorobenzidine	ND		mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
99-09-2	3-Nitroaniline	ND		mg/kg dry	0.102	0.203	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
534-52-1	4,6-Dinitro-2-methylphenol	ND	CAL-E	mg/kg dry	0.102	0.203	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
101-55-3	4-Bromophenyl phenyl ether	ND		mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
59-50-7	4-Chloro-3-methylphenol	ND		mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
106-47-8	4-Chloroaniline	ND		mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
7005-72-3	4-Chlorophenyl phenyl ether	ND		mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
100-01-6	4-Nitroaniline	ND		mg/kg dry	0.102	0.203	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
100-02-7	4-Nitrophenol	ND		mg/kg dry	0.102	0.203	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
83-32-9	**Acenaphthene**	**0.0820**	J	mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
208-96-8	Acenaphthylene	ND		mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
98-86-2	Acetophenone	ND		mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
62-53-3	Aniline	ND		mg/kg dry	0.203	0.407	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
120-12-7	**Anthracene**	**0.201**		mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
1912-24-9	Atrazine	ND		mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		

Sample Information

Client Sample ID: TS03_EL_1-3 **Sample ID:** 26A1278-01

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1278	170197605	Soil	January 29, 2026 8:50 am	01/29/2026

SVOA, 8270 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3546 SVOA

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
100-52-7	Benzaldehyde	ND		mg/kg dry	0.0509	0.102	2	EPA 8270E Certifications:	02/02/2026 12:00 NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854	02/03/2026 23:26	AK
92-87-5	Benzidine	ND		mg/kg dry	0.203	0.407	2	EPA 8270E Certifications:	02/02/2026 12:00 CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1	02/03/2026 23:26	AK
56-55-3	**Benzo(a)anthracene**	**0.400**		mg/kg dry	0.0509	0.102	2	EPA 8270E Certifications:	02/02/2026 12:00 CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1	02/03/2026 23:26	AK
50-32-8	**Benzo(a)pyrene**	**0.334**		mg/kg dry	0.0509	0.102	2	EPA 8270E Certifications:	02/02/2026 12:00 CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1	02/03/2026 23:26	AK
205-99-2	**Benzo(b)fluoranthene**	**0.318**		mg/kg dry	0.0509	0.102	2	EPA 8270E Certifications:	02/02/2026 12:00 CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1	02/03/2026 23:26	AK
191-24-2	**Benzo(g,h,i)perylene**	**0.197**		mg/kg dry	0.0509	0.102	2	EPA 8270E Certifications:	02/02/2026 12:00 CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1	02/03/2026 23:26	AK
207-08-9	**Benzo(k)fluoranthene**	**0.266**		mg/kg dry	0.0509	0.102	2	EPA 8270E Certifications:	02/02/2026 12:00 CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1	02/03/2026 23:26	AK
65-85-0	Benzoic acid	ND	CAL-E, ICVE	mg/kg dry	0.0509	0.102	2	EPA 8270E Certifications:	02/02/2026 12:00 NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854	02/03/2026 23:26	AK
100-51-6	Benzyl alcohol	ND		mg/kg dry	0.0509	0.102	2	EPA 8270E Certifications:	02/02/2026 12:00 NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854	02/03/2026 23:26	AK
85-68-7	**Benzyl butyl phthalate**	**0.642**		mg/kg dry	0.0509	0.102	2	EPA 8270E Certifications:	02/02/2026 12:00 CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1	02/03/2026 23:26	AK
111-91-1	Bis(2-chloroethoxy)methane	ND	CCVE	mg/kg dry	0.0509	0.102	2	EPA 8270E Certifications:	02/02/2026 12:00 CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1	02/03/2026 23:26	AK
111-44-4	Bis(2-chloroethyl)ether	ND		mg/kg dry	0.0509	0.102	2	EPA 8270E Certifications:	02/02/2026 12:00 CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1	02/03/2026 23:26	AK
108-60-1	Bis(2-chloroisopropyl)ether	ND	CCVE	mg/kg dry	0.0509	0.102	2	EPA 8270E Certifications:	02/02/2026 12:00 CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1	02/03/2026 23:26	AK
117-81-7	**Bis(2-ethylhexyl)phthalate**	**3.24**		mg/kg dry	0.0509	0.102	2	EPA 8270E Certifications:	02/02/2026 12:00 CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1	02/03/2026 23:26	AK
105-60-2	Caprolactam	ND		mg/kg dry	0.102	0.203	2	EPA 8270E Certifications:	02/02/2026 12:00 NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854	02/03/2026 23:26	AK
86-74-8	**Carbazole**	**0.0560**	J	mg/kg dry	0.0509	0.102	2	EPA 8270E Certifications:	02/02/2026 12:00 CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1	02/03/2026 23:26	AK
218-01-9	**Chrysene**	**0.395**		mg/kg dry	0.0509	0.102	2	EPA 8270E Certifications:	02/02/2026 12:00 CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1	02/03/2026 23:26	AK
53-70-3	Dibenzo(a,h)anthracene	ND		mg/kg dry	0.0509	0.102	2	EPA 8270E Certifications:	02/02/2026 12:00 CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1	02/03/2026 23:26	AK
132-64-9	Dibenzofuran	ND		mg/kg dry	0.0509	0.102	2	EPA 8270E Certifications:	02/02/2026 12:00 CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1	02/03/2026 23:26	AK
84-66-2	Diethyl phthalate	ND		mg/kg dry	0.0509	0.102	2	EPA 8270E Certifications:	02/02/2026 12:00 CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1	02/03/2026 23:26	AK
131-11-3	Dimethyl phthalate	ND		mg/kg dry	0.0509	0.102	2	EPA 8270E Certifications:	02/02/2026 12:00 CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1	02/03/2026 23:26	AK

Sample Information

Client Sample ID: TS03_EL_1-3 **Sample ID:** 26A1278-01

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1278	170197605	Soil	January 29, 2026 8:50 am	01/29/2026

SVOA, 8270 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3546 SVOA

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
84-74-2	**Di-n-butyl phthalate**	**0.0983**	J	mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
117-84-0	**Di-n-octyl phthalate**	**0.180**		mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
122-39-4	Diphenylamine	ND		mg/kg dry	0.102	0.203	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	PADEP-68-04440,NYSDOH-NY10854		
206-44-0	**Fluoranthene**	**0.974**		mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
86-73-7	**Fluorene**	**0.127**		mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
118-74-1	Hexachlorobenzene	ND		mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
87-68-3	Hexachlorobutadiene	ND		mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
77-47-4	Hexachlorocyclopentadiene	ND	ICVE	mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
67-72-1	Hexachloroethane	ND		mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
193-39-5	**Indeno(1,2,3-cd)pyrene**	**0.193**		mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
78-59-1	Isophorone	ND	CCVE	mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
91-20-3	**Naphthalene**	**1.06**		mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
98-95-3	Nitrobenzene	ND	CCVE	mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
62-75-9	N-Nitrosodimethylamine	ND		mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
621-64-7	N-nitroso-di-n-propylamine	ND		mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
86-30-6	N-Nitrosodiphenylamine	ND		mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
87-86-5	Pentachlorophenol	ND	CAL-E	mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
85-01-8	**Phenanthrene**	**0.665**		mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
108-95-2	Phenol	ND		mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
129-00-0	**Pyrene**	**0.835**	CCVE	mg/kg dry	0.0509	0.102	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
110-86-1	Pyridine	ND		mg/kg dry	0.203	0.407	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:26	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		

Surrogate Recoveries	Result	Acceptance Range

Sample Information

Client Sample ID: TS03_EL_1-3 **Sample ID:** 26A1278-01

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1278	170197605	Soil	January 29, 2026 8:50 am	01/29/2026

SVOA, 8270 MASTER

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3546 SVOA

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
367-12-4	*Surrogate: SURR: 2-Fluorophenol*	*35.3 %*			*20-108*						
13127-88-3	*Surrogate: SURR: Phenol-d6*	*36.1 %*			*23-114*						
4165-60-0	*Surrogate: SURR: Nitrobenzene-d5*	*42.2 %*			*22-108*						
321-60-8	*Surrogate: SURR: 2-Fluorobiphenyl*	*37.7 %*			*21-113*						
118-79-6	*Surrogate: SURR: 2,4,6-Tribromophenol*	*32.9 %*			*19-110*						
1718-51-0	*Surrogate: SURR: Terphenyl-d14*	*40.2 %*			*24-116*						

Total Solids

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	*** % Solids**	**81.8**		%	0.100	0.100	1	SM 2540G	01/30/2026 08:50	01/30/2026 09:13	BF
								Certifications: CTDPH-PH-0840			

Sample Information

Client Sample ID: TS02_EL_1-3 **Sample ID:** 26A1278-02

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1278	170197605	Soil	January 29, 2026 9:30 am	01/29/2026

VOA, 8260 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-55-6	1,1,1-Trichloroethane	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-34-5	1,1,2,2-Tetrachloroethane	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-00-5	1,1,2-Trichloroethane	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-34-3	1,1-Dichloroethane	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-35-4	1,1-Dichloroethylene	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-61-6	1,2,3-Trichlorobenzene	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
96-18-4	1,2,3-Trichloropropane	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
120-82-1	1,2,4-Trichlorobenzene	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
95-63-6	**1,2,4-Trimethylbenzene**	**35**		mg/kg dry	0.25	0.49	100	EPA 8260D	02/05/2026 13:00	02/07/2026 02:26	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
96-12-8	1,2-Dibromo-3-chloropropane	ND	QL-02	mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-93-4	1,2-Dibromoethane	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-50-1	1,2-Dichlorobenzene	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-06-2	1,2-Dichloroethane	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-87-5	1,2-Dichloropropane	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-67-8	**1,3,5-Trimethylbenzene**	**13**		mg/kg dry	0.25	0.49	100	EPA 8260D	02/05/2026 13:00	02/07/2026 02:26	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
541-73-1	1,3-Dichlorobenzene	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-46-7	1,4-Dichlorobenzene	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-93-3	2-Butanone	ND	QL-02	mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
591-78-6	**2-Hexanone**	**0.14**	QL-02	mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: TS02_EL_1-3 **Sample ID:** 26A1278-02

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1278	170197605	Soil	January 29, 2026 9:30 am	01/29/2026

VOA, 8260 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
108-10-1	**4-Methyl-2-pentanone**	**0.52**	QL-02	mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-64-1	**Acetone**	**0.32**		mg/kg dry	0.0073	0.015	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-02-8	Acrolein	ND		mg/kg dry	0.0073	0.015	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-13-1	Acrylonitrile	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-43-2	**Benzene**	**0.10**		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-97-5	Bromochloromethane	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
75-27-4	Bromodichloromethane	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-25-2	Bromoform	ND	QL-02	mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-83-9	Bromomethane	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-15-0	Carbon disulfide	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
56-23-5	Carbon tetrachloride	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-90-7	Chlorobenzene	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-00-3	Chloroethane	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-66-3	Chloroform	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-87-3	Chloromethane	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-59-2	cis-1,2-Dichloroethylene	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-01-5	cis-1,3-Dichloropropylene	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
110-82-7	**Cyclohexane**	**0.069**		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
124-48-1	Dibromochloromethane	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
74-95-3	Dibromomethane	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
75-71-8	Dichlorodifluoromethane	ND	CCVE	mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		

Sample Information

Client Sample ID: TS02_EL_1-3 **Sample ID:** 26A1278-02

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1278	170197605	Soil	January 29, 2026 9:30 am	01/29/2026

VOA, 8260 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
100-41-4	**Ethyl Benzene**	**9.0**		mg/kg dry	0.25	0.49	100	EPA 8260D	02/05/2026 13:00	02/07/2026 02:26	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-68-3	Hexachlorobutadiene	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
98-82-8	**Isopropylbenzene**	**0.11**		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-20-9	Methyl acetate	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
1634-04-4	Methyl tert-butyl ether (MTBE)	ND	QL-02	mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-87-2	**Methylcyclohexane**	**0.064**		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
75-09-2	Methylene chloride	ND		mg/kg dry	0.0073	0.015	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NJDEP-CT005,PADEP-68-0		
104-51-8	**n-Butylbenzene**	**0.078**		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
103-65-1	**n-Propylbenzene**	**0.21**		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-47-6	**o-Xylene**	**16**		mg/kg dry	0.25	0.49	100	EPA 8260D	02/05/2026 13:00	02/07/2026 02:26	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
179601-23-1	**p- & m- Xylenes**	**30**		mg/kg dry	0.49	0.99	100	EPA 8260D	02/05/2026 13:00	02/07/2026 02:26	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
99-87-6	p-Isopropyltoluene	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
135-98-8	sec-Butylbenzene	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
100-42-5	Styrene	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-65-0	tert-Butyl alcohol (TBA)	ND		mg/kg dry	0.018	0.036	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
98-06-6	tert-Butylbenzene	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
127-18-4	Tetrachloroethylene	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-88-3	**Toluene**	**9.5**		mg/kg dry	0.25	0.49	100	EPA 8260D	02/05/2026 13:00	02/07/2026 02:26	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-60-5	trans-1,2-Dichloroethylene	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-02-6	trans-1,3-Dichloropropylene	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-01-6	Trichloroethylene	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: TS02_EL_1-3 **Sample ID:** 26A1278-02

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1278	170197605	Soil	January 29, 2026 9:30 am	01/29/2026

VOA, 8260 MASTER

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-69-4	Trichlorofluoromethane	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-01-4	Vinyl Chloride	ND		mg/kg dry	0.0036	0.0073	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:02	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
1330-20-7	**Xylenes, Total**	**46**		mg/kg dry	0.74	1.5	100	EPA 8260D	02/05/2026 13:00	02/07/2026 02:26	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: SURR: 1,2-Dichloroethane-d4*	*118 %*	*77-125*
2037-26-5	*Surrogate: SURR: Toluene-d8*	*104 %*	*85-120*
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*130 %*	*76-130*

SVOA, 8270 MASTER

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3546 SVOA

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
92-52-4	1,1-Biphenyl	ND		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		mg/kg dry	0.0971	0.194	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
122-66-7	1,2-Diphenylhydrazine (as Azobenzene)	ND	CCVE	mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
58-90-2	2,3,4,6-Tetrachlorophenol	ND		mg/kg dry	0.0971	0.194	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
95-95-4	2,4,5-Trichlorophenol	ND		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
88-06-2	2,4,6-Trichlorophenol	ND		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
120-83-2	2,4-Dichlorophenol	ND		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
105-67-9	2,4-Dimethylphenol	ND		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
51-28-5	2,4-Dinitrophenol	ND		mg/kg dry	0.0971	0.194	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
121-14-2	2,4-Dinitrotoluene	ND		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
606-20-2	2,6-Dinitrotoluene	ND		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
91-58-7	2-Chloronaphthalene	ND		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
95-57-8	2-Chlorophenol	ND		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		

Sample Information

Client Sample ID: TS02_EL_1-3 **Sample ID:** 26A1278-02

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1278	170197605	Soil	January 29, 2026 9:30 am	01/29/2026

SVOA, 8270 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3546 SVOA

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
91-57-6	**2-Methylnaphthalene**	**3.26**		mg/kg dry	0.243	0.485	10	EPA 8270E	02/02/2026 12:00	02/04/2026 14:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
95-48-7	2-Methylphenol	ND		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
88-74-4	2-Nitroaniline	ND		mg/kg dry	0.0971	0.194	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
88-75-5	2-Nitrophenol	ND		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
65794-96-9	* 3- & 4-Methylphenols	ND		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840		
91-94-1	3,3-Dichlorobenzidine	ND		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
99-09-2	3-Nitroaniline	ND		mg/kg dry	0.0971	0.194	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
534-52-1	4,6-Dinitro-2-methylphenol	ND	CAL-E	mg/kg dry	0.0971	0.194	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
101-55-3	4-Bromophenyl phenyl ether	ND		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
59-50-7	4-Chloro-3-methylphenol	ND		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
106-47-8	4-Chloroaniline	ND		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
7005-72-3	4-Chlorophenyl phenyl ether	ND		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
100-01-6	4-Nitroaniline	ND		mg/kg dry	0.0971	0.194	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
100-02-7	4-Nitrophenol	ND		mg/kg dry	0.0971	0.194	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
83-32-9	**Acenaphthene**	**2.05**		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
208-96-8	**Acenaphthylene**	**0.168**		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
98-86-2	Acetophenone	ND		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
62-53-3	Aniline	ND		mg/kg dry	0.194	0.389	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
120-12-7	**Anthracene**	**1.97**		mg/kg dry	0.243	0.485	10	EPA 8270E	02/02/2026 12:00	02/04/2026 14:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
1912-24-9	Atrazine	ND		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
100-52-7	Benzaldehyde	ND		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		

Sample Information

Client Sample ID: TS02_EL_1-3 **Sample ID:** 26A1278-02

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1278	170197605	Soil	January 29, 2026 9:30 am	01/29/2026

SVOA, 8270 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3546 SVOA

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
92-87-5	Benzidine	ND		mg/kg dry	0.194	0.389	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
56-55-3	**Benzo(a)anthracene**	**4.01**		mg/kg dry	0.243	0.485	10	EPA 8270E	02/02/2026 12:00	02/04/2026 14:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
50-32-8	**Benzo(a)pyrene**	**3.45**		mg/kg dry	0.243	0.485	10	EPA 8270E	02/02/2026 12:00	02/04/2026 14:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
205-99-2	**Benzo(b)fluoranthene**	**3.26**		mg/kg dry	0.243	0.485	10	EPA 8270E	02/02/2026 12:00	02/04/2026 14:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
191-24-2	**Benzo(g,h,i)perylene**	**2.87**		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
207-08-9	**Benzo(k)fluoranthene**	**2.72**		mg/kg dry	0.243	0.485	10	EPA 8270E	02/02/2026 12:00	02/04/2026 14:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
65-85-0	Benzoic acid	ND	CAL-E, ICVE	mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
100-51-6	Benzyl alcohol	ND		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
85-68-7	**Benzyl butyl phthalate**	**0.811**		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
111-91-1	Bis(2-chloroethoxy)methane	ND	CCVE	mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
111-44-4	Bis(2-chloroethyl)ether	ND		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
108-60-1	Bis(2-chloroisopropyl)ether	ND	CCVE	mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
117-81-7	**Bis(2-ethylhexyl)phthalate**	**6.60**		mg/kg dry	0.243	0.485	10	EPA 8270E	02/02/2026 12:00	02/04/2026 14:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
105-60-2	Caprolactam	ND		mg/kg dry	0.0971	0.194	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
86-74-8	**Carbazole**	**1.17**		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
218-01-9	**Chrysene**	**3.51**		mg/kg dry	0.243	0.485	10	EPA 8270E	02/02/2026 12:00	02/04/2026 14:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
53-70-3	**Dibenzo(a,h)anthracene**	**1.11**		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
132-64-9	Dibenzofuran	ND		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
84-66-2	Diethyl phthalate	ND		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
131-11-3	Dimethyl phthalate	ND		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
84-74-2	**Di-n-butyl phthalate**	**0.184**		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		

Sample Information

Client Sample ID: TS02_EL_1-3 **Sample ID:** 26A1278-02

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1278	170197605	Soil	January 29, 2026 9:30 am	01/29/2026

SVOA, 8270 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3546 SVOA

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
117-84-0	**Di-n-octyl phthalate**	**1.51**		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
122-39-4	Diphenylamine	ND		mg/kg dry	0.0971	0.194	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	PADEP-68-04440,NYSDOH-NY10854		
206-44-0	**Fluoranthene**	**7.54**		mg/kg dry	0.243	0.485	10	EPA 8270E	02/02/2026 12:00	02/04/2026 14:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
86-73-7	**Fluorene**	**2.32**		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
118-74-1	Hexachlorobenzene	ND		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
87-68-3	Hexachlorobutadiene	ND		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
77-47-4	Hexachlorocyclopentadiene	ND	ICVE	mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
67-72-1	Hexachloroethane	ND		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
193-39-5	**Indeno(1,2,3-cd)pyrene**	**2.06**		mg/kg dry	0.243	0.485	10	EPA 8270E	02/02/2026 12:00	02/04/2026 14:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
78-59-1	Isophorone	ND	CCVE	mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
91-20-3	**Naphthalene**	**3.21**		mg/kg dry	0.243	0.485	10	EPA 8270E	02/02/2026 12:00	02/04/2026 14:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
98-95-3	Nitrobenzene	ND	CCVE	mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
62-75-9	N-Nitrosodimethylamine	ND		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
621-64-7	N-nitroso-di-n-propylamine	ND		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
86-30-6	N-Nitrosodiphenylamine	ND		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
87-86-5	Pentachlorophenol	ND	CAL-E	mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
85-01-8	**Phenanthrene**	**7.44**		mg/kg dry	0.243	0.485	10	EPA 8270E	02/02/2026 12:00	02/04/2026 14:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
108-95-2	Phenol	ND		mg/kg dry	0.0487	0.0971	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
129-00-0	**Pyrene**	**7.24**		mg/kg dry	0.243	0.485	10	EPA 8270E	02/02/2026 12:00	02/04/2026 14:05	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
110-86-1	Pyridine	ND		mg/kg dry	0.194	0.389	2	EPA 8270E	02/02/2026 12:00	02/03/2026 23:57	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		

	Surrogate Recoveries	Result	Acceptance Range
367-12-4	*Surrogate: SURR: 2-Fluorophenol*	*31.7 %*	*20-108*
13127-88-3	*Surrogate: SURR: Phenol-d6*	*32.5 %*	*23-114*

Sample Information

Client Sample ID: TS02_EL_1-3 **Sample ID:** 26A1278-02

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1278	170197605	Soil	January 29, 2026 9:30 am	01/29/2026

SVOA, 8270 MASTER

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3546 SVOA

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
4165-60-0	*Surrogate: SURR: Nitrobenzene-d5*	*37.0 %*			*22-108*						
321-60-8	*Surrogate: SURR: 2-Fluorobiphenyl*	*34.2 %*			*21-113*						
118-79-6	*Surrogate: SURR: 2,4,6-Tribromophenol*	*37.7 %*			*19-110*						
1718-51-0	*Surrogate: SURR: Terphenyl-d14*	*41.4 %*			*24-116*						

Total Solids

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	*** % Solids**	**85.6**		%	0.100	0.100	1	SM 2540G	01/30/2026 08:50	01/30/2026 09:13	BF
								Certifications: CTDPH-PH-0840			

Sample Information

Client Sample ID: TS01_EL_4-6 **Sample ID:** 26A1278-03

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1278	170197605	Soil	January 29, 2026 11:15 am	01/29/2026

VOA, 8260 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-55-6	1,1,1-Trichloroethane	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-34-5	1,1,2,2-Tetrachloroethane	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-00-5	1,1,2-Trichloroethane	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-34-3	**1,1-Dichloroethane**	**0.0044**	J	mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-35-4	1,1-Dichloroethylene	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-61-6	1,2,3-Trichlorobenzene	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
96-18-4	1,2,3-Trichloropropane	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
120-82-1	1,2,4-Trichlorobenzene	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
95-63-6	**1,2,4-Trimethylbenzene**	**360**		mg/kg dry	2.6	5.2	1000	EPA 8260D	02/05/2026 13:00	02/10/2026 10:25	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
96-12-8	1,2-Dibromo-3-chloropropane	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-93-4	1,2-Dibromoethane	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-50-1	1,2-Dichlorobenzene	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-06-2	1,2-Dichloroethane	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-87-5	1,2-Dichloropropane	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-67-8	**1,3,5-Trimethylbenzene**	**80**		mg/kg dry	0.52	1.0	200	EPA 8260D	02/05/2026 13:00	02/07/2026 03:20	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
541-73-1	1,3-Dichlorobenzene	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-46-7	1,4-Dichlorobenzene	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-93-3	**2-Butanone**	**0.023**		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
591-78-6	2-Hexanone	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: TS01_EL_4-6 **Sample ID:** 26A1278-03

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1278	170197605	Soil	January 29, 2026 11:15 am	01/29/2026

VOA, 8260 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
108-10-1	4-Methyl-2-pentanone	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-64-1	**Acetone**	**0.14**		mg/kg dry	0.0056	0.011	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-02-8	Acrolein	ND		mg/kg dry	0.0056	0.011	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-13-1	Acrylonitrile	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-43-2	**Benzene**	**8.2**		mg/kg dry	0.52	1.0	200	EPA 8260D	02/05/2026 13:00	02/07/2026 03:20	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-97-5	Bromochloromethane	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
75-27-4	Bromodichloromethane	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-25-2	Bromoform	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-83-9	Bromomethane	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-15-0	Carbon disulfide	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
56-23-5	Carbon tetrachloride	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-90-7	Chlorobenzene	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-00-3	Chloroethane	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-66-3	Chloroform	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-87-3	**Chloromethane**	**0.0039**	J	mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-59-2	**cis-1,2-Dichloroethylene**	**0.032**		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-01-5	cis-1,3-Dichloropropylene	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
110-82-7	**Cyclohexane**	**13**		mg/kg dry	0.52	1.0	200	EPA 8260D	02/05/2026 13:00	02/07/2026 03:20	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
124-48-1	Dibromochloromethane	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
74-95-3	Dibromomethane	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		
75-71-8	Dichlorodifluoromethane	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-6		

Sample Information

Client Sample ID: TS01_EL_4-6 **Sample ID:** 26A1278-03

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1278	170197605	Soil	January 29, 2026 11:15 am	01/29/2026

VOA, 8260 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
100-41-4	**Ethyl Benzene**	**25**		mg/kg dry	0.52	1.0	200	EPA 8260D	02/05/2026 13:00	02/07/2026 03:20	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-68-3	Hexachlorobutadiene	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
98-82-8	**Isopropylbenzene**	**0.27**		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-20-9	Methyl acetate	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
1634-04-4	**Methyl tert-butyl ether (MTBE)**	**2.6**		mg/kg dry	0.52	1.0	200	EPA 8260D	02/05/2026 13:00	02/07/2026 03:20	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-87-2	**Methylcyclohexane**	**5.1**		mg/kg dry	0.52	1.0	200	EPA 8260D	02/05/2026 13:00	02/07/2026 03:20	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
75-09-2	Methylene chloride	ND		mg/kg dry	0.0056	0.011	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NJDEP-CT005,PADEP-68-0		
104-51-8	**n-Butylbenzene**	**25**		mg/kg dry	0.52	1.0	200	EPA 8260D	02/05/2026 13:00	02/07/2026 03:20	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
103-65-1	**n-Propylbenzene**	**33**		mg/kg dry	0.52	1.0	200	EPA 8260D	02/05/2026 13:00	02/07/2026 03:20	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-47-6	**o-Xylene**	**53**		mg/kg dry	0.52	1.0	200	EPA 8260D	02/05/2026 13:00	02/07/2026 03:20	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
179601-23-1	**p- & m- Xylenes**	**110**		mg/kg dry	1.0	2.1	200	EPA 8260D	02/05/2026 13:00	02/07/2026 03:20	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
99-87-6	**p-Isopropyltoluene**	**0.059**		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
135-98-8	**sec-Butylbenzene**	**0.12**		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
100-42-5	**Styrene**	**0.26**		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-65-0	tert-Butyl alcohol (TBA)	ND		mg/kg dry	0.014	0.028	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
98-06-6	tert-Butylbenzene	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
127-18-4	Tetrachloroethylene	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-88-3	**Toluene**	**46**		mg/kg dry	0.52	1.0	200	EPA 8260D	02/05/2026 13:00	02/07/2026 03:20	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-60-5	trans-1,2-Dichloroethylene	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-02-6	trans-1,3-Dichloropropylene	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-01-6	Trichloroethylene	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: TS01_EL_4-6 **Sample ID:** 26A1278-03

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1278	170197605	Soil	January 29, 2026 11:15 am	01/29/2026

VOA, 8260 MASTER

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-69-4	Trichlorofluoromethane	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-01-4	Vinyl Chloride	ND		mg/kg dry	0.0028	0.0056	1	EPA 8260D	02/05/2026 13:00	02/06/2026 02:29	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
1330-20-7	**Xylenes, Total**	**170**		mg/kg dry	1.5	3.1	200	EPA 8260D	02/05/2026 13:00	02/07/2026 03:20	PRS
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: SURR: 1,2-Dichloroethane-d4*	*82.7 %*	*77-125*
2037-26-5	*Surrogate: SURR: Toluene-d8*	*109 %*	*85-120*
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*115 %*	*76-130*

SVOA, 8270 MASTER

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3546 SVOA

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
92-52-4	1,1-Biphenyl	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		mg/kg dry	0.0928	0.185	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
122-66-7	1,2-Diphenylhydrazine (as Azobenzene)	ND	CCVE	mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
58-90-2	2,3,4,6-Tetrachlorophenol	ND		mg/kg dry	0.0928	0.185	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
95-95-4	2,4,5-Trichlorophenol	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
88-06-2	2,4,6-Trichlorophenol	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
120-83-2	2,4-Dichlorophenol	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
105-67-9	2,4-Dimethylphenol	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
51-28-5	2,4-Dinitrophenol	ND		mg/kg dry	0.0928	0.185	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
121-14-2	2,4-Dinitrotoluene	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
606-20-2	2,6-Dinitrotoluene	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
91-58-7	2-Chloronaphthalene	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
95-57-8	2-Chlorophenol	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		

Sample Information

Client Sample ID: TS01_EL_4-6 **Sample ID:** 26A1278-03

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1278	170197605	Soil	January 29, 2026 11:15 am	01/29/2026

SVOA, 8270 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3546 SVOA

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
91-57-6	2-Methylnaphthalene	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
95-48-7	2-Methylphenol	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
88-74-4	2-Nitroaniline	ND		mg/kg dry	0.0928	0.185	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
88-75-5	2-Nitrophenol	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
65794-96-9	* 3- & 4-Methylphenols	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840		
91-94-1	3,3-Dichlorobenzidine	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
99-09-2	3-Nitroaniline	ND		mg/kg dry	0.0928	0.185	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
534-52-1	4,6-Dinitro-2-methylphenol	ND	CAL-E	mg/kg dry	0.0928	0.185	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
101-55-3	4-Bromophenyl phenyl ether	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
59-50-7	4-Chloro-3-methylphenol	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
106-47-8	4-Chloroaniline	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
7005-72-3	4-Chlorophenyl phenyl ether	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
100-01-6	4-Nitroaniline	ND		mg/kg dry	0.0928	0.185	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
100-02-7	4-Nitrophenol	ND		mg/kg dry	0.0928	0.185	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
83-32-9	Acenaphthene	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
208-96-8	Acenaphthylene	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
98-86-2	Acetophenone	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
62-53-3	Aniline	ND		mg/kg dry	0.186	0.372	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
120-12-7	Anthracene	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
1912-24-9	Atrazine	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
100-52-7	Benzaldehyde	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		

Sample Information

Client Sample ID: TS01_EL_4-6 **Sample ID:** 26A1278-03

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1278	170197605	Soil	January 29, 2026 11:15 am	01/29/2026

SVOA, 8270 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3546 SVOA

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
92-87-5	Benzidine	ND		mg/kg dry	0.186	0.372	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
56-55-3	**Benzo(a)anthracene**	**0.0964**		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
50-32-8	**Benzo(a)pyrene**	**0.142**		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
205-99-2	**Benzo(b)fluoranthene**	**0.106**		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
191-24-2	**Benzo(g,h,i)perylene**	**0.0823**	J	mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
207-08-9	**Benzo(k)fluoranthene**	**0.0979**		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
65-85-0	Benzoic acid	ND	ICVE, CAL-E	mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
100-51-6	Benzyl alcohol	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
85-68-7	Benzyl butyl phthalate	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
111-91-1	Bis(2-chloroethoxy)methane	ND	CCVE	mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
111-44-4	Bis(2-chloroethyl)ether	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
108-60-1	Bis(2-chloroisopropyl)ether	ND	CCVE	mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
117-81-7	Bis(2-ethylhexyl)phthalate	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
105-60-2	Caprolactam	ND		mg/kg dry	0.0928	0.185	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
86-74-8	Carbazole	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
218-01-9	**Chrysene**	**0.0942**		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
53-70-3	Dibenzo(a,h)anthracene	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
132-64-9	Dibenzofuran	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
84-66-2	Diethyl phthalate	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
131-11-3	Dimethyl phthalate	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
84-74-2	Di-n-butyl phthalate	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		

Sample Information

Client Sample ID: TS01_EL_4-6 **Sample ID:** 26A1278-03

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1278	170197605	Soil	January 29, 2026 11:15 am	01/29/2026

SVOA, 8270 MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3546 SVOA

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
117-84-0	Di-n-octyl phthalate	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
122-39-4	Diphenylamine	ND		mg/kg dry	0.0928	0.185	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	PADEP-68-04440,NYSDOH-NY10854		
206-44-0	**Fluoranthene**	**0.128**		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
86-73-7	Fluorene	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	NJDEP-CT005,PADEP-68-04440,NYSDOH-NY10854		
118-74-1	Hexachlorobenzene	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
87-68-3	Hexachlorobutadiene	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
77-47-4	Hexachlorocyclopentadiene	ND	ICVE	mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
67-72-1	Hexachloroethane	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
193-39-5	**Indeno(1,2,3-cd)pyrene**	**0.0875**	J	mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
78-59-1	Isophorone	ND	CCVE	mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
91-20-3	Naphthalene	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
98-95-3	Nitrobenzene	ND	CCVE	mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
62-75-9	N-Nitrosodimethylamine	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
621-64-7	N-nitroso-di-n-propylamine	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
86-30-6	N-Nitrosodiphenylamine	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
87-86-5	Pentachlorophenol	ND	CAL-E	mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
85-01-8	**Phenanthrene**	**0.0586**	J	mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
108-95-2	Phenol	ND		mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
129-00-0	**Pyrene**	**0.111**	CCVE	mg/kg dry	0.0465	0.0928	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		
110-86-1	Pyridine	ND		mg/kg dry	0.186	0.372	2	EPA 8270E	02/02/2026 12:00	02/04/2026 00:27	AK
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,PADEP-68-04440,NYSDOH-NY1		

	Surrogate Recoveries	Result	Acceptance Range
367-12-4	*Surrogate: SURR: 2-Fluorophenol*	*53.5 %*	*20-108*
13127-88-3	*Surrogate: SURR: Phenol-d6*	*48.9 %*	*23-114*

Sample Information

Client Sample ID: TS01_EL_4-6 **Sample ID:** 26A1278-03

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1278	170197605	Soil	January 29, 2026 11:15 am	01/29/2026

SVOA, 8270 MASTER

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3546 SVOA

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
4165-60-0	*Surrogate: SURR: Nitrobenzene-d5*	*51.8 %*			*22-108*						
321-60-8	*Surrogate: SURR: 2-Fluorobiphenyl*	*52.2 %*			*21-113*						
118-79-6	*Surrogate: SURR: 2,4,6-Tribromophenol*	*61.0 %*			*19-110*						
1718-51-0	*Surrogate: SURR: Terphenyl-d14*	*57.0 %*			*24-116*						

Total Solids

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	*** % Solids**	**89.6**		%	0.100	0.100	1	SM 2540G	01/30/2026 08:50	01/30/2026 09:13	BF
								Certifications: CTDPH-PH-0840			

Analytical Batch Summary

Batch ID: BA61712 **Preparation Method:** % Solids Prep **Prepared By:** BNF

Sample ID	Client Sample ID	Preparation Date
26A1278-01	TS03_EL_1-3	01/30/26
26A1278-02	TS02_EL_1-3	01/30/26
26A1278-03	TS01_EL_4-6	01/30/26
BA61712-DUP1	Duplicate	01/30/26

Batch ID: BB60019 **Preparation Method:** EPA 3546 SVOA **Prepared By:** RB

Sample ID	Client Sample ID	Preparation Date
26A1278-01	TS03_EL_1-3	02/02/26
26A1278-02	TS02_EL_1-3	02/02/26
26A1278-02RE1	TS02_EL_1-3	02/02/26
26A1278-03	TS01_EL_4-6	02/02/26

Batch ID: BB60294 **Preparation Method:** EPA 5035A **Prepared By:** PRS

Sample ID	Client Sample ID	Preparation Date
26A1278-01	TS03_EL_1-3	02/05/26
26A1278-02	TS02_EL_1-3	02/05/26
26A1278-03	TS01_EL_4-6	02/05/26
BB60294-BLK1	Blank	02/05/26
BB60294-BS1	LCS	02/05/26
BB60294-BSD1	LCS Dup	02/05/26

Batch ID: BB60349 **Preparation Method:** EPA 5035A **Prepared By:** PRS

Sample ID	Client Sample ID	Preparation Date
26A1278-01RE1	TS03_EL_1-3	02/05/26
26A1278-01RE2	TS03_EL_1-3	02/05/26
26A1278-02RE1	TS02_EL_1-3	02/05/26
26A1278-03RE1	TS01_EL_4-6	02/05/26
26A1278-03RE2	TS01_EL_4-6	02/05/26
BB60349-BLK2	Blank	02/06/26
BB60349-BS2	LCS	02/06/26
BB60349-BSD2	LCS Dup	02/06/26

Batch ID: BB60507 **Preparation Method:** EPA 5035A **Prepared By:** PRS

Sample ID	Client Sample ID	Preparation Date
26A1278-01RE3	TS03_EL_1-3	02/05/26
26A1278-03RE3	TS01_EL_4-6	02/05/26
BB60507-BLK2	Blank	02/10/26
BB60507-BS2	LCS	02/10/26

BB60507-BSD2	LCS Dup	02/10/26

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BB60294 - EPA 5035A

Blank (BB60294-BLK1) Blank — Prepared & Analyzed: 02/05/2026

1,1,1,2-Tetrachloroethane	ND	0.0050	mg/kg wet
1,1,1-Trichloroethane	ND	0.0050	"
1,1,2,2-Tetrachloroethane	ND	0.0050	"
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.0050	"
1,1,2-Trichloroethane	ND	0.0050	"
1,1-Dichloroethane	ND	0.0050	"
1,1-Dichloroethylene	ND	0.0050	"
1,2,3-Trichlorobenzene	ND	0.0050	"
1,2,3-Trichloropropane	ND	0.0050	"
1,2,4-Trichlorobenzene	ND	0.0050	"
1,2,4-Trimethylbenzene	ND	0.0050	"
1,2-Dibromo-3-chloropropane	ND	0.0050	"
1,2-Dibromoethane	ND	0.0050	"
1,2-Dichlorobenzene	ND	0.0050	"
1,2-Dichloroethane	ND	0.0050	"
1,2-Dichloropropane	ND	0.0050	"
1,3,5-Trimethylbenzene	ND	0.0050	"
1,3-Dichlorobenzene	ND	0.0050	"
1,4-Dichlorobenzene	ND	0.0050	"
2-Butanone	ND	0.0050	"
2-Hexanone	ND	0.0050	"
4-Methyl-2-pentanone	ND	0.0050	"
Acetone	ND	0.010	"
Acrolein	ND	0.010	"
Acrylonitrile	ND	0.0050	"
Benzene	ND	0.0050	"
Bromochloromethane	ND	0.0050	"
Bromodichloromethane	ND	0.0050	"
Bromoform	ND	0.0050	"
Bromomethane	ND	0.0050	"
Carbon disulfide	ND	0.0050	"
Carbon tetrachloride	ND	0.0050	"
Chlorobenzene	ND	0.0050	"
Chloroethane	ND	0.0050	"
Chloroform	ND	0.0050	"
Chloromethane	ND	0.0050	"
cis-1,2-Dichloroethylene	ND	0.0050	"
cis-1,3-Dichloropropylene	ND	0.0050	"
Cyclohexane	ND	0.0050	"
Dibromochloromethane	ND	0.0050	"
Dibromomethane	ND	0.0050	"
Dichlorodifluoromethane	ND	0.0050	"
Ethyl Benzene	ND	0.0050	"
Hexachlorobutadiene	ND	0.0050	"
Isopropylbenzene	ND	0.0050	"
Methyl acetate	ND	0.0050	"
Methyl tert-butyl ether (MTBE)	ND	0.0050	"
Methylcyclohexane	ND	0.0050	"
Methylene chloride	0.010	0.010	"

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60294 - EPA 5035A											
Blank (BB60294-BLK1) Blank								Prepared & Analyzed: 02/05/2026			
n-Butylbenzene	ND	0.0050	mg/kg wet								
n-Propylbenzene	ND	0.0050	"								
o-Xylene	ND	0.0050	"								
p- & m- Xylenes	ND	0.010	"								
p-Isopropyltoluene	ND	0.0050	"								
sec-Butylbenzene	ND	0.0050	"								
Styrene	ND	0.0050	"								
tert-Butyl alcohol (TBA)	ND	0.025	"								
tert-Butylbenzene	ND	0.0050	"								
Tetrachloroethylene	ND	0.0050	"								
Toluene	ND	0.0050	"								
trans-1,2-Dichloroethylene	ND	0.0050	"								
trans-1,3-Dichloropropylene	ND	0.0050	"								
Trichloroethylene	ND	0.0050	"								
Trichlorofluoromethane	ND	0.0050	"								
Vinyl Chloride	ND	0.0050	"								
Xylenes, Total	ND	0.015	"								
Surrogate: SURR: 1,2-Dichloroethane-d4	*50.1*		*ug/L*	*50.0*		*100*	*77-125*				
Surrogate: SURR: Toluene-d8	*52.9*		*"*	*50.0*		*106*	*85-120*				
Surrogate: SURR: p-Bromofluorobenzene	*53.7*		*"*	*50.0*		*107*	*76-130*				
LCS (BB60294-BS1) LCS								Prepared & Analyzed: 02/05/2026			
1,1,1,2-Tetrachloroethane	44.8		ug/L	50.0		89.6	75-129				
1,1,1-Trichloroethane	43.3		"	50.0		86.5	71-137				
1,1,2,2-Tetrachloroethane	45.0		"	50.0		89.9	79-129				
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	0.0393	0.0050	mg/kg wet				58-146				
1,1,2-Trichloroethane	45.4		ug/L	50.0		90.7	83-123				
1,1-Dichloroethane	43.7		"	50.0		87.4	75-130				
1,1-Dichloroethylene	41.2		"	50.0		82.5	64-137				
1,2,3-Trichlorobenzene	49.2		"	50.0		98.4	81-140				
1,2,3-Trichloropropane	44.6		"	50.0		89.2	81-126				
1,2,4-Trichlorobenzene	50.0		"	50.0		99.9	80-141				
1,2,4-Trimethylbenzene	44.7		"	50.0		89.4	84-125				
1,2-Dibromo-3-chloropropane	37.0		"	50.0		74.0	74-142				
1,2-Dibromoethane	46.4		"	50.0		92.8	86-123				
1,2-Dichlorobenzene	44.0		"	50.0		88.1	85-122				
1,2-Dichloroethane	43.5		"	50.0		87.1	71-133				
1,2-Dichloropropane	43.4		"	50.0		86.9	81-122				
1,3,5-Trimethylbenzene	45.3		"	50.0		90.5	82-126				
1,3-Dichlorobenzene	46.2		"	50.0		92.4	84-124				
1,4-Dichlorobenzene	45.7		"	50.0		91.3	84-124				
2-Butanone	43.6		"	100		43.6	58-147	Low Bias			
2-Hexanone	47.3		"	100		47.3	70-139	Low Bias			
4-Methyl-2-pentanone	46.9		"	100		46.9	72-132	Low Bias			
Acetone	47.2		"	100		47.2	36-155				
Acrolein	105		"	200		52.5	10-238				
Acrylonitrile	46.3		"	50.0		92.5	66-141				
Benzene	43.2		"	50.0		86.5	77-127				
Bromochloromethane	44.6		"	50.0		89.2	74-129				
Bromodichloromethane	43.4		"	50.0		86.8	81-124				

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60294 - EPA 5035A											
LCS (BB60294-BS1) LCS							Prepared & Analyzed: 02/05/2026				
Bromoform	39.3		ug/L	50.0		78.6	80-136	Low Bias			
Bromomethane	48.0		"	50.0		96.1	32-177				
Carbon disulfide	39.1		"	50.0		78.1	10-136				
Carbon tetrachloride	44.7		"	50.0		89.3	66-143				
Chlorobenzene	44.5		"	50.0		88.9	86-120				
Chloroethane	58.0		"	50.0		116	51-142				
Chloroform	43.2		"	50.0		86.3	76-131				
Chloromethane	40.3		"	50.0		80.7	49-132				
cis-1,2-Dichloroethylene	44.5		"	50.0		89.0	74-132				
cis-1,3-Dichloropropylene	43.4		"	50.0		86.8	81-129				
Cyclohexane	40.7		"	50.0		81.4	70-130				
Dibromochloromethane	42.1		"	50.0		84.2	10-200				
Dibromomethane	45.7		"	50.0		91.4	83-124				
Dichlorodifluoromethane	32.8		"	50.0		65.6	28-158				
Ethyl Benzene	44.2		"	50.0		88.4	84-125				
Hexachlorobutadiene	44.0		"	50.0		88.1	83-133				
Isopropylbenzene	46.7		"	50.0		93.4	81-127				
Methyl acetate	42.7		"	50.0		85.4	41-143				
Methyl tert-butyl ether (MTBE)	44.4		"	100		44.4	74-131	Low Bias			
Methylcyclohexane	40.6		"	50.0		81.3	70-130				
Methylene chloride	46.8		"	50.0		93.6	57-141				
n-Butylbenzene	45.6		"	50.0		91.1	80-130				
n-Propylbenzene	46.4		"	50.0		92.9	74-136				
o-Xylene	45.6		"	50.0		91.3	83-123				
p- & m- Xylenes	90.2		"	100		90.2	82-128				
p-Isopropyltoluene	44.5		"	50.0		89.0	85-125				
sec-Butylbenzene	46.1		"	50.0		92.2	83-125				
Styrene	45.6		"	50.0		91.2	86-126				
tert-Butyl alcohol (TBA)	221		"	250		88.6	70-130				
tert-Butylbenzene	45.9		"	50.0		91.8	80-127				
Tetrachloroethylene	43.2		"	50.0		86.5	80-129				
Toluene	44.4		"	50.0		88.8	85-121				
trans-1,2-Dichloroethylene	42.7		"	50.0		85.5	72-132				
trans-1,3-Dichloropropylene	42.2		"	50.0		84.3	78-132				
Trichloroethylene	43.1		"	50.0		86.1	84-123				
Trichlorofluoromethane	42.1		"	50.0		84.3	62-140				
Vinyl Chloride	42.2		"	50.0		84.4	52-130				
Surrogate: SURR: 1,2-Dichloroethane-d4	*49.9*		*"*	*50.0*		*99.7*	*77-125*				
Surrogate: SURR: Toluene-d8	*51.8*		*"*	*50.0*		*104*	*85-120*				
Surrogate: SURR: p-Bromofluorobenzene	*51.4*		*"*	*50.0*		*103*	*76-130*				

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60294 - EPA 5035A											
LCS Dup (BB60294-BSD1) LCS Dup								Prepared & Analyzed: 02/05/2026			
1,1,1,2-Tetrachloroethane	49.7		ug/L	50.0		99.4	75-129		10.4	30	
1,1,1-Trichloroethane	46.7		"	50.0		93.4	71-137		7.69	30	
1,1,2,2-Tetrachloroethane	50.6		"	50.0		101	79-129		11.7	30	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	0.0427	0.0050	mg/kg wet				58-146		8.34	30	
1,1,2-Trichloroethane	50.8		ug/L	50.0		102	83-123		11.4	30	
1,1-Dichloroethane	47.0		"	50.0		94.0	75-130		7.25	30	
1,1-Dichloroethylene	44.8		"	50.0		89.6	64-137		8.23	30	
1,2,3-Trichlorobenzene	53.8		"	50.0		108	81-140		9.03	30	
1,2,3-Trichloropropane	51.0		"	50.0		102	81-126		13.5	30	
1,2,4-Trichlorobenzene	53.9		"	50.0		108	80-141		7.53	30	
1,2,4-Trimethylbenzene	48.0		"	50.0		95.9	84-125		7.08	30	
1,2-Dibromo-3-chloropropane	43.8		"	50.0		87.5	74-142		16.8	30	
1,2-Dibromoethane	52.6		"	50.0		105	86-123		12.5	30	
1,2-Dichlorobenzene	48.7		"	50.0		97.4	85-122		10.1	30	
1,2-Dichloroethane	48.2		"	50.0		96.5	71-133		10.3	30	
1,2-Dichloropropane	47.6		"	50.0		95.2	81-122		9.10	30	
1,3,5-Trimethylbenzene	49.0		"	50.0		98.1	82-126		8.02	30	
1,3-Dichlorobenzene	50.2		"	50.0		100	84-124		8.40	30	
1,4-Dichlorobenzene	49.8		"	50.0		99.5	84-124		8.57	30	
2-Butanone	49.0		"	100		49.0	58-147	Low Bias	11.8	30	
2-Hexanone	55.5		"	100		55.5	70-139	Low Bias	16.0	30	
4-Methyl-2-pentanone	54.7		"	100		54.7	72-132	Low Bias	15.4	30	
Acetone	54.0		"	100		54.0	36-155		13.4	30	
Acrolein	119		"	200		59.3	10-238		12.2	30	
Acrylonitrile	52.2		"	50.0		104	66-141		12.0	30	
Benzene	47.0		"	50.0		94.0	77-127		8.35	30	
Bromochloromethane	49.5		"	50.0		99.0	74-129		10.4	30	
Bromodichloromethane	48.6		"	50.0		97.1	81-124		11.3	30	
Bromoform	46.8		"	50.0		93.6	80-136		17.4	30	
Bromomethane	52.6		"	50.0		105	32-177		8.97	30	
Carbon disulfide	43.6		"	50.0		87.2	10-136		11.0	30	
Carbon tetrachloride	49.1		"	50.0		98.2	66-143		9.41	30	
Chlorobenzene	48.8		"	50.0		97.7	86-120		9.39	30	
Chloroethane	62.1		"	50.0		124	51-142		6.81	30	
Chloroform	46.9		"	50.0		93.9	76-131		8.37	30	
Chloromethane	42.8		"	50.0		85.5	49-132		5.87	30	
cis-1,2-Dichloroethylene	48.2		"	50.0		96.5	74-132		8.09	30	
cis-1,3-Dichloropropylene	48.7		"	50.0		97.4	81-129		11.5	30	
Cyclohexane	43.8		"	50.0		87.6	70-130		7.39	30	
Dibromochloromethane	48.8		"	50.0		97.5	10-200		14.7	30	
Dibromomethane	51.1		"	50.0		102	83-124		11.2	30	
Dichlorodifluoromethane	33.8		"	50.0		67.7	28-158		3.21	30	
Ethyl Benzene	48.5		"	50.0		97.0	84-125		9.26	30	
Hexachlorobutadiene	47.3		"	50.0		94.6	83-133		7.16	30	
Isopropylbenzene	50.5		"	50.0		101	81-127		7.74	30	
Methyl acetate	48.4		"	50.0		96.7	41-143		12.4	30	
Methyl tert-butyl ether (MTBE)	49.3		"	100		49.3	74-131	Low Bias	10.5	30	
Methylcyclohexane	43.9		"	50.0		87.9	70-130		7.76	30	
Methylene chloride	50.8		"	50.0		102	57-141		8.25	30	
n-Butylbenzene	49.0		"	50.0		97.9	80-130		7.24	30	

Volatile Organic Compounds by GC/MS - Quality Control Data

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Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60294 - EPA 5035A											
LCS Dup (BB60294-BSD1) LCS Dup								Prepared & Analyzed: 02/05/2026			
n-Propylbenzene	50.0		ug/L	50.0		100	74-136		7.46	30	
o-Xylene	49.9		"	50.0		99.9	83-123		9.00	30	
p- & m- Xylenes	99.0		"	100		99.0	82-128		9.34	30	
p-Isopropyltoluene	47.9		"	50.0		95.7	85-125		7.34	30	
sec-Butylbenzene	49.8		"	50.0		99.6	83-125		7.72	30	
Styrene	50.3		"	50.0		101	86-126		9.76	30	
tert-Butyl alcohol (TBA)	258		"	250		103	70-130		15.1	30	
tert-Butylbenzene	49.4		"	50.0		98.7	80-127		7.29	30	
Tetrachloroethylene	46.5		"	50.0		92.9	80-129		7.18	30	
Toluene	48.7		"	50.0		97.3	85-121		9.20	30	
trans-1,2-Dichloroethylene	46.0		"	50.0		92.0	72-132		7.33	30	
trans-1,3-Dichloropropylene	48.1		"	50.0		96.2	78-132		13.1	30	
Trichloroethylene	47.0		"	50.0		94.1	84-123		8.81	30	
Trichlorofluoromethane	45.6		"	50.0		91.3	62-140		7.95	30	
Vinyl Chloride	44.9		"	50.0		89.7	52-130		6.09	30	
Surrogate: SURR: 1,2-Dichloroethane-d4	*50.3*		*"*	*50.0*		*101*	*77-125*				
Surrogate: SURR: Toluene-d8	*51.5*		*"*	*50.0*		*103*	*85-120*				
Surrogate: SURR: p-Bromofluorobenzene	*50.8*		*"*	*50.0*		*102*	*76-130*				
Batch BB60349 - EPA 5035A											
Blank (BB60349-BLK2) Blank								Prepared & Analyzed: 02/06/2026			
1,1,1,2-Tetrachloroethane	ND	0.50	mg/kg wet								
1,1,1-Trichloroethane	ND	0.50	"								
1,1,2,2-Tetrachloroethane	ND	0.50	"								
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"								
1,1,2-Trichloroethane	ND	0.50	"								
1,1-Dichloroethane	ND	0.50	"								
1,1-Dichloroethylene	ND	0.50	"								
1,2,3-Trichlorobenzene	ND	0.50	"								
1,2,3-Trichloropropane	ND	0.50	"								
1,2,4-Trichlorobenzene	ND	0.50	"								
1,2,4-Trimethylbenzene	ND	0.50	"								
1,2-Dibromo-3-chloropropane	ND	0.50	"								
1,2-Dibromoethane	ND	0.50	"								
1,2-Dichlorobenzene	ND	0.50	"								
1,2-Dichloroethane	ND	0.50	"								
1,2-Dichloropropane	ND	0.50	"								
1,3,5-Trimethylbenzene	ND	0.50	"								
1,3-Dichlorobenzene	ND	0.50	"								
1,4-Dichlorobenzene	ND	0.50	"								
2-Butanone	ND	0.50	"								
2-Hexanone	ND	0.50	"								
4-Methyl-2-pentanone	ND	0.50	"								
Acetone	ND	1.0	"								
Acrolein	ND	1.0	"								
Acrylonitrile	ND	0.50	"								
Benzene	ND	0.50	"								
Bromochloromethane	ND	0.50	"								
Bromodichloromethane	ND	0.50	"								
Bromoform	ND	0.50	"								

Volatile Organic Compounds by GC/MS - Quality Control Data

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Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60349 - EPA 5035A											
Blank (BB60349-BLK2) Blank									Prepared & Analyzed: 02/06/2026		
Bromomethane	ND	0.50	mg/kg wet								
Carbon disulfide	ND	0.50	"								
Carbon tetrachloride	ND	0.50	"								
Chlorobenzene	ND	0.50	"								
Chloroethane	ND	0.50	"								
Chloroform	ND	0.50	"								
Chloromethane	ND	0.50	"								
cis-1,2-Dichloroethylene	ND	0.50	"								
cis-1,3-Dichloropropylene	ND	0.50	"								
Cyclohexane	ND	0.50	"								
Dibromochloromethane	ND	0.50	"								
Dibromomethane	ND	0.50	"								
Dichlorodifluoromethane	ND	0.50	"								
Ethyl Benzene	ND	0.50	"								
Hexachlorobutadiene	ND	0.50	"								
Isopropylbenzene	ND	0.50	"								
Methyl acetate	ND	0.50	"								
Methyl tert-butyl ether (MTBE)	ND	0.50	"								
Methylcyclohexane	ND	0.50	"								
Methylene chloride	2.8	1.0	"								
n-Butylbenzene	ND	0.50	"								
n-Propylbenzene	ND	0.50	"								
o-Xylene	ND	0.50	"								
p- & m- Xylenes	ND	1.0	"								
p-Isopropyltoluene	ND	0.50	"								
sec-Butylbenzene	ND	0.50	"								
Styrene	ND	0.50	"								
tert-Butyl alcohol (TBA)	ND	2.5	"								
tert-Butylbenzene	ND	0.50	"								
Tetrachloroethylene	ND	0.50	"								
Toluene	ND	0.50	"								
trans-1,2-Dichloroethylene	ND	0.50	"								
trans-1,3-Dichloropropylene	ND	0.50	"								
Trichloroethylene	ND	0.50	"								
Trichlorofluoromethane	ND	0.50	"								
Vinyl Chloride	ND	0.50	"								
Xylenes, Total	ND	1.5	"								
Surrogate: SURR: 1,2-Dichloroethane-d4	*48.6*		*ug/L*	*50.0*		*97.3*	*77-125*				
Surrogate: SURR: Toluene-d8	*52.4*		*"*	*50.0*		*105*	*85-120*				
Surrogate: SURR: p-Bromofluorobenzene	*54.0*		*"*	*50.0*		*108*	*76-130*				

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60349 - EPA 5035A											
LCS (BB60349-BS2) LCS							Prepared & Analyzed: 02/06/2026				
1,1,1,2-Tetrachloroethane	43.0		ug/L	50.0		85.9	75-129				
1,1,1-Trichloroethane	43.1		"	50.0		86.2	71-137				
1,1,2,2-Tetrachloroethane	43.3		"	50.0		86.6	79-129				
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	5.44	0.50	mg/kg wet				58-146				
1,1,2-Trichloroethane	43.4		ug/L	50.0		86.8	83-123				
1,1-Dichloroethane	43.2		"	50.0		86.5	75-130				
1,1-Dichloroethylene	49.3		"	50.0		98.6	64-137				
1,2,3-Trichlorobenzene	41.0		"	50.0		82.0	81-140				
1,2,3-Trichloropropane	42.5		"	50.0		84.9	81-126				
1,2,4-Trichlorobenzene	40.1		"	50.0		80.2	80-141				
1,2,4-Trimethylbenzene	43.6		"	50.0		87.1	84-125				
1,2-Dibromo-3-chloropropane	30.2		"	50.0		60.3	74-142	Low Bias			
1,2-Dibromoethane	44.0		"	50.0		88.0	86-123				
1,2-Dichlorobenzene	43.6		"	50.0		87.1	85-122				
1,2-Dichloroethane	40.9		"	50.0		81.8	71-133				
1,2-Dichloropropane	43.1		"	50.0		86.1	81-122				
1,3,5-Trimethylbenzene	45.9		"	50.0		91.8	82-126				
1,3-Dichlorobenzene	41.9		"	50.0		83.8	84-124	Low Bias			
1,4-Dichlorobenzene	43.3		"	50.0		86.5	84-124				
2-Butanone	39.4		"	100		39.4	58-147	Low Bias			
2-Hexanone	39.2		"	100		39.2	70-139	Low Bias			
4-Methyl-2-pentanone	39.8		"	100		39.8	72-132	Low Bias			
Acetone	56.5		"	100		56.5	36-155				
Acrolein	100		"	200		50.2	10-238				
Acrylonitrile	45.1		"	50.0		90.2	66-141				
Benzene	43.4		"	50.0		86.8	77-127				
Bromochloromethane	42.9		"	50.0		85.8	74-129				
Bromodichloromethane	41.9		"	50.0		83.8	81-124				
Bromoform	33.0		"	50.0		66.1	80-136	Low Bias			
Bromomethane	43.7		"	50.0		87.5	32-177				
Carbon disulfide	46.1		"	50.0		92.1	10-136				
Carbon tetrachloride	43.0		"	50.0		85.9	66-143				
Chlorobenzene	44.2		"	50.0		88.5	86-120				
Chloroethane	25.7		"	50.0		51.4	51-142				
Chloroform	42.8		"	50.0		85.6	76-131				
Chloromethane	37.2		"	50.0		74.3	49-132				
cis-1,2-Dichloroethylene	43.2		"	50.0		86.5	74-132				
cis-1,3-Dichloropropylene	43.2		"	50.0		86.4	81-129				
Cyclohexane	44.1		"	50.0		88.2	70-130				
Dibromochloromethane	37.9		"	50.0		75.8	10-200				
Dibromomethane	44.7		"	50.0		89.4	83-124				
Dichlorodifluoromethane	23.9		"	50.0		47.9	28-158				
Ethyl Benzene	43.4		"	50.0		86.9	84-125				
Hexachlorobutadiene	40.8		"	50.0		81.6	83-133	Low Bias			
Isopropylbenzene	45.9		"	50.0		91.8	81-127				
Methyl acetate	46.8		"	50.0		93.5	41-143				
Methyl tert-butyl ether (MTBE)	40.1		"	100		40.1	74-131	Low Bias			
Methylcyclohexane	43.2		"	50.0		86.3	70-130				
Methylene chloride	71.8		"	50.0		144	57-141	High Bias			
n-Butylbenzene	42.8		"	50.0		85.6	80-130				

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60349 - EPA 5035A											
LCS (BB60349-BS2) LCS							Prepared & Analyzed: 02/06/2026				
n-Propylbenzene	45.2		ug/L	50.0		90.3	74-136				
o-Xylene	44.0		"	50.0		88.1	83-123				
p- & m- Xylenes	88.5		"	100		88.5	82-128				
p-Isopropyltoluene	43.8		"	50.0		87.7	85-125				
sec-Butylbenzene	45.5		"	50.0		91.1	83-125				
Styrene	41.6		"	50.0		83.2	86-126	Low Bias			
tert-Butyl alcohol (TBA)	200		"	250		79.9	70-130				
tert-Butylbenzene	45.0		"	50.0		90.0	80-127				
Tetrachloroethylene	34.0		"	50.0		68.1	80-129	Low Bias			
Toluene	44.7		"	50.0		89.4	85-121				
trans-1,2-Dichloroethylene	42.6		"	50.0		85.3	72-132				
trans-1,3-Dichloropropylene	37.8		"	50.0		75.6	78-132	Low Bias			
Trichloroethylene	43.3		"	50.0		86.5	84-123				
Trichlorofluoromethane	37.7		"	50.0		75.5	62-140				
Vinyl Chloride	38.3		"	50.0		76.6	52-130				
Surrogate: SURR: 1,2-Dichloroethane-d4	*47.8*		*"*	*50.0*		*95.5*	*77-125*				
Surrogate: SURR: Toluene-d8	*52.5*		*"*	*50.0*		*105*	*85-120*				
Surrogate: SURR: p-Bromofluorobenzene	*50.1*		*"*	*50.0*		*100*	*76-130*				
LCS Dup (BB60349-BSD2) LCS Dup							Prepared & Analyzed: 02/06/2026				
1,1,1,2-Tetrachloroethane	43.6		ug/L	50.0		87.2	75-129		1.41	30	
1,1,1-Trichloroethane	44.0		"	50.0		88.0	71-137		2.09	30	
1,1,2,2-Tetrachloroethane	44.4		"	50.0		88.8	79-129		2.53	30	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	6.05	0.50	mg/kg wet				58-146		10.7	30	
1,1,2-Trichloroethane	44.3		ug/L	50.0		88.7	83-123		2.10	30	
1,1-Dichloroethane	44.6		"	50.0		89.3	75-130		3.21	30	
1,1-Dichloroethylene	53.0		"	50.0		106	64-137		7.16	30	
1,2,3-Trichlorobenzene	41.8		"	50.0		83.6	81-140		2.03	30	
1,2,3-Trichloropropane	44.8		"	50.0		89.6	81-126		5.36	30	
1,2,4-Trichlorobenzene	39.9		"	50.0		79.7	80-141	Low Bias	0.575	30	
1,2,4-Trimethylbenzene	43.5		"	50.0		87.0	84-125		0.161	30	
1,2-Dibromo-3-chloropropane	32.0		"	50.0		64.0	74-142	Low Bias	5.89	30	
1,2-Dibromoethane	45.5		"	50.0		91.1	86-123		3.40	30	
1,2-Dichlorobenzene	43.4		"	50.0		86.9	85-122		0.299	30	
1,2-Dichloroethane	42.3		"	50.0		84.7	71-133		3.41	30	
1,2-Dichloropropane	44.2		"	50.0		88.4	81-122		2.59	30	
1,3,5-Trimethylbenzene	45.2		"	50.0		90.3	82-126		1.60	30	
1,3-Dichlorobenzene	41.8		"	50.0		83.6	84-124	Low Bias	0.311	30	
1,4-Dichlorobenzene	43.5		"	50.0		87.0	84-124		0.507	30	
2-Butanone	41.6		"	100		41.6	58-147	Low Bias	5.48	30	
2-Hexanone	42.1		"	100		42.1	70-139	Low Bias	7.06	30	
4-Methyl-2-pentanone	40.7		"	100		40.7	72-132	Low Bias	2.24	30	
Acetone	59.2		"	100		59.2	36-155		4.56	30	
Acrolein	118		"	200		58.8	10-238		15.7	30	
Acrylonitrile	47.4		"	50.0		94.7	66-141		4.89	30	
Benzene	44.4		"	50.0		88.7	77-127		2.16	30	
Bromochloromethane	43.8		"	50.0		87.6	74-129		2.01	30	
Bromodichloromethane	41.7		"	50.0		83.4	81-124		0.502	30	
Bromoform	33.9		"	50.0		67.7	80-136	Low Bias	2.51	30	
Bromomethane	60.5		"	50.0		121	32-177		32.1	30	Non-dir.

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60349 - EPA 5035A											
LCS Dup (BB60349-BSD2) LCS Dup							Prepared & Analyzed: 02/06/2026				
Carbon disulfide	59.6		ug/L	50.0		119	10-136		25.7	30	
Carbon tetrachloride	45.0		"	50.0		90.1	66-143		4.77	30	
Chlorobenzene	44.0		"	50.0		87.9	86-120		0.635	30	
Chloroethane	22.9		"	50.0		45.8	51-142	Low Bias	11.6	30	
Chloroform	43.2		"	50.0		86.3	76-131		0.791	30	
Chloromethane	63.9		"	50.0		128	49-132		52.9	30	Non-dir.
cis-1,2-Dichloroethylene	44.1		"	50.0		88.2	74-132		2.01	30	
cis-1,3-Dichloropropylene	43.3		"	50.0		86.7	81-129		0.347	30	
Cyclohexane	50.2		"	50.0		100	70-130		12.9	30	
Dibromochloromethane	38.8		"	50.0		77.6	10-200		2.30	30	
Dibromomethane	46.5		"	50.0		93.0	83-124		3.97	30	
Dichlorodifluoromethane	80.0		"	50.0		160	28-158	High Bias	108	30	Non-dir.
Ethyl Benzene	43.8		"	50.0		87.7	84-125		0.894	30	
Hexachlorobutadiene	40.0		"	50.0		80.1	83-133	Low Bias	1.90	30	
Isopropylbenzene	46.3		"	50.0		92.6	81-127		0.803	30	
Methyl acetate	52.1		"	50.0		104	41-143		10.8	30	
Methyl tert-butyl ether (MTBE)	43.4		"	100		43.4	74-131	Low Bias	7.83	30	
Methylcyclohexane	47.8		"	50.0		95.5	70-130		10.1	30	
Methylene chloride	75.9		"	50.0		152	57-141	High Bias	5.54	30	
n-Butylbenzene	42.9		"	50.0		85.7	80-130		0.163	30	
n-Propylbenzene	45.6		"	50.0		91.1	74-136		0.882	30	
o-Xylene	43.9		"	50.0		87.9	83-123		0.227	30	
p- & m- Xylenes	89.4		"	100		89.4	82-128		0.944	30	
p-Isopropyltoluene	44.0		"	50.0		88.1	85-125		0.455	30	
sec-Butylbenzene	45.9		"	50.0		91.9	83-125		0.875	30	
Styrene	43.4		"	50.0		86.7	86-126		4.12	30	
tert-Butyl alcohol (TBA)	98.0		"	250		39.2	70-130	Low Bias	68.3	30	Non-dir.
tert-Butylbenzene	45.6		"	50.0		91.2	80-127		1.32	30	
Tetrachloroethylene	34.4		"	50.0		68.8	80-129	Low Bias	1.02	30	
Toluene	45.2		"	50.0		90.4	85-121		1.20	30	
trans-1,2-Dichloroethylene	45.2		"	50.0		90.4	72-132		5.90	30	
trans-1,3-Dichloropropylene	37.8		"	50.0		75.7	78-132	Low Bias	0.106	30	
Trichloroethylene	44.7		"	50.0		89.4	84-123		3.27	30	
Trichlorofluoromethane	49.1		"	50.0		98.2	62-140		26.2	30	
Vinyl Chloride	64.8		"	50.0		130	52-130		51.5	30	Non-dir.
Surrogate: SURR: 1,2-Dichloroethane-d4	*48.2*		*"*	*50.0*		*96.4*	*77-125*				
Surrogate: SURR: Toluene-d8	*52.6*		*"*	*50.0*		*105*	*85-120*				
Surrogate: SURR: p-Bromofluorobenzene	*50.6*		*"*	*50.0*		*101*	*76-130*				

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BB60507 - EPA 5035A

Blank (BB60507-BLK2) Blank — Prepared & Analyzed: 02/10/2026

1,1,1,2-Tetrachloroethane	ND	0.50	mg/kg wet
1,1,1-Trichloroethane	ND	0.50	"
1,1,2,2-Tetrachloroethane	ND	0.50	"
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"
1,1,2-Trichloroethane	ND	0.50	"
1,1-Dichloroethane	ND	0.50	"
1,1-Dichloroethylene	ND	0.50	"
1,2,3-Trichlorobenzene	ND	0.50	"
1,2,3-Trichloropropane	ND	0.50	"
1,2,4-Trichlorobenzene	ND	0.50	"
1,2,4-Trimethylbenzene	ND	0.50	"
1,2-Dibromo-3-chloropropane	ND	0.50	"
1,2-Dibromoethane	ND	0.50	"
1,2-Dichlorobenzene	ND	0.50	"
1,2-Dichloroethane	ND	0.50	"
1,2-Dichloropropane	ND	0.50	"
1,3,5-Trimethylbenzene	ND	0.50	"
1,3-Dichlorobenzene	ND	0.50	"
1,4-Dichlorobenzene	ND	0.50	"
2-Butanone	ND	0.50	"
2-Hexanone	ND	0.50	"
4-Methyl-2-pentanone	ND	0.50	"
Acetone	ND	1.0	"
Acrolein	ND	1.0	"
Acrylonitrile	ND	0.50	"
Benzene	ND	0.50	"
Bromochloromethane	ND	0.50	"
Bromodichloromethane	ND	0.50	"
Bromoform	ND	0.50	"
Bromomethane	ND	0.50	"
Carbon disulfide	ND	0.50	"
Carbon tetrachloride	ND	0.50	"
Chlorobenzene	ND	0.50	"
Chloroethane	ND	0.50	"
Chloroform	ND	0.50	"
Chloromethane	ND	0.50	"
cis-1,2-Dichloroethylene	ND	0.50	"
cis-1,3-Dichloropropylene	ND	0.50	"
Cyclohexane	ND	0.50	"
Dibromochloromethane	ND	0.50	"
Dibromomethane	ND	0.50	"
Dichlorodifluoromethane	ND	0.50	"
Ethyl Benzene	ND	0.50	"
Hexachlorobutadiene	ND	0.50	"
Isopropylbenzene	ND	0.50	"
Methyl acetate	ND	0.50	"
Methyl tert-butyl ether (MTBE)	ND	0.50	"
Methylcyclohexane	ND	0.50	"
Methylene chloride	ND	1.0	"
n-Butylbenzene	ND	0.50	"

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60507 - EPA 5035A											
Blank (BB60507-BLK2) Blank								Prepared & Analyzed: 02/10/2026			
n-Propylbenzene	ND	0.50	mg/kg wet								
o-Xylene	ND	0.50	"								
p- & m- Xylenes	ND	1.0	"								
p-Isopropyltoluene	ND	0.50	"								
sec-Butylbenzene	ND	0.50	"								
Styrene	ND	0.50	"								
tert-Butyl alcohol (TBA)	ND	2.5	"								
tert-Butylbenzene	ND	0.50	"								
Tetrachloroethylene	ND	0.50	"								
Toluene	ND	0.50	"								
trans-1,2-Dichloroethylene	ND	0.50	"								
trans-1,3-Dichloropropylene	ND	0.50	"								
Trichloroethylene	ND	0.50	"								
Trichlorofluoromethane	ND	0.50	"								
Vinyl Chloride	ND	0.50	"								
Xylenes, Total	ND	1.5	"								
Surrogate: SURR: 1,2-Dichloroethane-d4	*47.9*		*ug/L*	*50.0*		*95.8*	*77-125*				
Surrogate: SURR: Toluene-d8	*52.3*		*"*	*50.0*		*105*	*85-120*				
Surrogate: SURR: p-Bromofluorobenzene	*54.1*		*"*	*50.0*		*108*	*76-130*				
LCS (BB60507-BS2) LCS								Prepared & Analyzed: 02/10/2026			
1,1,1,2-Tetrachloroethane	44.1		ug/L	50.0		88.2	75-129				
1,1,1-Trichloroethane	44.5		"	50.0		89.0	71-137				
1,1,2,2-Tetrachloroethane	43.0		"	50.0		86.1	79-129				
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	55.6		"	50.0		111	58-146				
1,1,2-Trichloroethane	43.3		"	50.0		86.7	83-123				
1,1-Dichloroethane	43.3		"	50.0		86.7	75-130				
1,1-Dichloroethylene	50.2		"	50.0		100	64-137				
1,2,3-Trichlorobenzene	43.2		"	50.0		86.4	81-140				
1,2,3-Trichloropropane	42.6		"	50.0		85.2	81-126				
1,2,4-Trichlorobenzene	45.4		"	50.0		90.9	80-141				
1,2,4-Trimethylbenzene	46.9		"	50.0		93.8	84-125				
1,2-Dibromo-3-chloropropane	29.8		"	50.0		59.7	74-142	Low Bias			
1,2-Dibromoethane	43.6		"	50.0		87.1	86-123				
1,2-Dichlorobenzene	45.5		"	50.0		91.1	85-122				
1,2-Dichloroethane	40.3		"	50.0		80.5	71-133				
1,2-Dichloropropane	43.3		"	50.0		86.6	81-122				
1,3,5-Trimethylbenzene	49.2		"	50.0		98.3	82-126				
1,3-Dichlorobenzene	45.7		"	50.0		91.4	84-124				
1,4-Dichlorobenzene	46.8		"	50.0		93.7	84-124				
2-Butanone	38.9		"	50.0		77.8	58-147				
2-Hexanone	37.6		"	50.0		75.2	70-139				
4-Methyl-2-pentanone	37.9		"	50.0		75.9	72-132				
Acetone	57.4		"	50.0		115	36-155				
Acrolein	103		"	200		51.6	10-238				
Acrylonitrile	42.5		"	50.0		85.0	66-141				
Benzene	44.6		"	50.0		89.1	77-127				
Bromochloromethane	42.8		"	50.0		85.6	74-129				
Bromodichloromethane	42.9		"	50.0		85.8	81-124				
Bromoform	34.0		"	50.0		67.9	80-136	Low Bias			

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60507 - EPA 5035A											
LCS (BB60507-BS2) LCS							Prepared & Analyzed: 02/10/2026				
Bromomethane	43.9		ug/L	50.0		87.7	32-177				
Carbon disulfide	45.4		"	50.0		90.8	10-136				
Carbon tetrachloride	45.0		"	50.0		89.9	66-143				
Chlorobenzene	46.3		"	50.0		92.5	86-120				
Chloroethane	30.2		"	50.0		60.4	51-142				
Chloroform	43.4		"	50.0		86.9	76-131				
Chloromethane	32.2		"	50.0		64.4	49-132				
cis-1,2-Dichloroethylene	43.8		"	50.0		87.6	74-132				
cis-1,3-Dichloropropylene	43.8		"	50.0		87.7	81-129				
Cyclohexane	44.4		"	50.0		88.8	70-130				
Dibromochloromethane	39.0		"	50.0		78.1	10-200				
Dibromomethane	44.8		"	50.0		89.7	83-124				
Dichlorodifluoromethane	15.9		"	50.0		31.8	28-158				
Ethyl Benzene	46.2		"	50.0		92.3	84-125				
Hexachlorobutadiene	45.5		"	50.0		91.1	83-133				
Isopropylbenzene	48.7		"	50.0		97.5	81-127				
Methyl acetate	43.9		"	50.0		87.7	41-143				
Methyl tert-butyl ether (MTBE)	37.7		"	50.0		75.4	74-131				
Methylcyclohexane	44.8		"	50.0		89.5	70-130				
Methylene chloride	50.9		"	50.0		102	57-141				
n-Butylbenzene	48.9		"	50.0		97.9	80-130				
n-Propylbenzene	48.9		"	50.0		97.8	74-136				
o-Xylene	45.8		"	50.0		91.5	83-123				
p- & m- Xylenes	94.9		"	100		94.9	82-128				
p-Isopropyltoluene	49.5		"	50.0		99.0	85-125				
sec-Butylbenzene	48.8		"	50.0		97.6	83-125				
Styrene	43.2		"	50.0		86.4	86-126				
tert-Butyl alcohol (TBA)	191		"	250		76.4	70-130				
tert-Butylbenzene	46.8		"	50.0		93.6	80-127				
Tetrachloroethylene	37.6		"	50.0		75.2	80-129	Low Bias			
Toluene	47.3		"	50.0		94.6	85-121				
trans-1,2-Dichloroethylene	43.8		"	50.0		87.7	72-132				
trans-1,3-Dichloropropylene	38.6		"	50.0		77.3	78-132	Low Bias			
Trichloroethylene	45.2		"	50.0		90.3	84-123				
Trichlorofluoromethane	41.8		"	50.0		83.5	62-140				
Vinyl Chloride	35.2		"	50.0		70.4	52-130				
Surrogate: SURR: 1,2-Dichloroethane-d4	*46.2*		*"*	*50.0*		*92.3*	*77-125*				
Surrogate: SURR: Toluene-d8	*53.0*		*"*	*50.0*		*106*	*85-120*				
Surrogate: SURR: p-Bromofluorobenzene	*49.5*		*"*	*50.0*		*99.1*	*76-130*				

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60507 - EPA 5035A											
LCS Dup (BB60507-BSD2) LCS Dup							Prepared & Analyzed: 02/10/2026				
1,1,1,2-Tetrachloroethane	47.7		ug/L	50.0		95.4	75-129		7.86	30	
1,1,1-Trichloroethane	48.1		"	50.0		96.1	71-137		7.76	30	
1,1,2,2-Tetrachloroethane	48.8		"	50.0		97.6	79-129		12.6	30	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	58.2		"	50.0		116	58-146		4.60	30	
1,1,2-Trichloroethane	47.9		"	50.0		95.7	83-123		9.96	30	
1,1-Dichloroethane	46.9		"	50.0		93.8	75-130		7.93	30	
1,1-Dichloroethylene	52.9		"	50.0		106	64-137		5.21	30	
1,2,3-Trichlorobenzene	48.5		"	50.0		96.9	81-140		11.5	30	
1,2,3-Trichloropropane	47.1		"	50.0		94.2	81-126		10.1	30	
1,2,4-Trichlorobenzene	49.8		"	50.0		99.6	80-141		9.13	30	
1,2,4-Trimethylbenzene	49.7		"	50.0		99.4	84-125		5.78	30	
1,2-Dibromo-3-chloropropane	34.6		"	50.0		69.2	74-142	Low Bias	14.8	30	
1,2-Dibromoethane	49.3		"	50.0		98.5	86-123		12.3	30	
1,2-Dichlorobenzene	49.2		"	50.0		98.3	85-122		7.62	30	
1,2-Dichloroethane	44.8		"	50.0		89.7	71-133		10.7	30	
1,2-Dichloropropane	47.3		"	50.0		94.6	81-122		8.85	30	
1,3,5-Trimethylbenzene	52.0		"	50.0		104	82-126		5.56	30	
1,3-Dichlorobenzene	49.3		"	50.0		98.6	84-124		7.60	30	
1,4-Dichlorobenzene	50.4		"	50.0		101	84-124		7.32	30	
2-Butanone	45.3		"	50.0		90.6	58-147		15.1	30	
2-Hexanone	44.0		"	50.0		87.9	70-139		15.6	30	
4-Methyl-2-pentanone	44.3		"	50.0		88.6	72-132		15.5	30	
Acetone	60.8		"	50.0		122	36-155		5.78	30	
Acrolein	118		"	200		58.8	10-238		13.1	30	
Acrylonitrile	48.5		"	50.0		97.0	66-141		13.1	30	
Benzene	48.4		"	50.0		96.7	77-127		8.14	30	
Bromochloromethane	47.2		"	50.0		94.3	74-129		9.69	30	
Bromodichloromethane	46.8		"	50.0		93.5	81-124		8.54	30	
Bromoform	39.1		"	50.0		78.1	80-136	Low Bias	14.0	30	
Bromomethane	47.0		"	50.0		94.0	32-177		6.91	30	
Carbon disulfide	48.3		"	50.0		96.7	10-136		6.21	30	
Carbon tetrachloride	48.2		"	50.0		96.4	66-143		6.98	30	
Chlorobenzene	49.8		"	50.0		99.7	86-120		7.45	30	
Chloroethane	27.7		"	50.0		55.4	51-142		8.60	30	
Chloroform	47.5		"	50.0		95.0	76-131		8.91	30	
Chloromethane	33.8		"	50.0		67.6	49-132		4.91	30	
cis-1,2-Dichloroethylene	47.4		"	50.0		94.9	74-132		7.93	30	
cis-1,3-Dichloropropylene	48.2		"	50.0		96.4	81-129		9.52	30	
Cyclohexane	47.4		"	50.0		94.8	70-130		6.60	30	
Dibromochloromethane	43.0		"	50.0		86.0	10-200		9.73	30	
Dibromomethane	49.4		"	50.0		98.8	83-124		9.72	30	
Dichlorodifluoromethane	17.2		"	50.0		34.4	28-158		7.86	30	
Ethyl Benzene	49.1		"	50.0		98.2	84-125		6.17	30	
Hexachlorobutadiene	48.5		"	50.0		96.9	83-133		6.23	30	
Isopropylbenzene	50.9		"	50.0		102	81-127		4.36	30	
Methyl acetate	49.7		"	50.0		99.5	41-143		12.5	30	
Methyl tert-butyl ether (MTBE)	42.9		"	50.0		85.8	74-131		12.9	30	
Methylcyclohexane	47.7		"	50.0		95.4	70-130		6.34	30	
Methylene chloride	54.9		"	50.0		110	57-141		7.65	30	
n-Butylbenzene	51.5		"	50.0		103	80-130		5.14	30	

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60507 - EPA 5035A											
LCS Dup (BB60507-BSD2) LCS Dup								Prepared & Analyzed: 02/10/2026			
n-Propylbenzene	51.1		ug/L	50.0		102	74-136		4.42	30	
o-Xylene	49.2		"	50.0		98.4	83-123		7.25	30	
p- & m- Xylenes	101		"	100		101	82-128		6.52	30	
p-Isopropyltoluene	52.2		"	50.0		104	85-125		5.23	30	
sec-Butylbenzene	51.5		"	50.0		103	83-125		5.40	30	
Styrene	46.9		"	50.0		93.9	86-126		8.25	30	
tert-Butyl alcohol (TBA)	226		"	250		90.3	70-130		16.7	30	
tert-Butylbenzene	49.6		"	50.0		99.2	80-127		5.79	30	
Tetrachloroethylene	39.2		"	50.0		78.5	80-129	Low Bias	4.22	30	
Toluene	50.0		"	50.0		100	85-121		5.49	30	
trans-1,2-Dichloroethylene	47.2		"	50.0		94.5	72-132		7.44	30	
trans-1,3-Dichloropropylene	42.9		"	50.0		85.9	78-132		10.6	30	
Trichloroethylene	48.4		"	50.0		96.7	84-123		6.86	30	
Trichlorofluoromethane	44.0		"	50.0		88.0	62-140		5.18	30	
Vinyl Chloride	37.5		"	50.0		75.1	52-130		6.41	30	
Surrogate: SURR: 1,2-Dichloroethane-d4	*47.6*		*"*	*50.0*		*95.2*	*77-125*				
Surrogate: SURR: Toluene-d8	*52.3*		*"*	*50.0*		*105*	*85-120*				
Surrogate: SURR: p-Bromofluorobenzene	*48.8*		*"*	*50.0*		*97.6*	*76-130*				

Miscellaneous Physical Parameters - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BA61712 - % Solids Prep											
Duplicate (BA61712-DUP1) Duplicate	*Source sample: 26A1278-03 (TS01_EL_4-6)								Prepared & Analyzed: 01/30/2026		
% Solids	89.8	0.100	%		89.6				0.221	20	

Volatile Analysis Sample Containers

Lab ID	Client Sample ID	Volatile Sample Container
26A1278-01	TS03_EL_1-3	40mL Vial with Stir Bar-Cool 4° C
26A1278-02	TS02_EL_1-3	40mL Vial with Stir Bar-Cool 4° C
26A1278-03	TS01_EL_4-6	40mL Vial with Stir Bar-Cool 4° C

Sample and Data Qualifiers Relating to This Work Order

QL-02	This LCS analyte is outside Laboratory Recovery limits due the analyte behavior using the referenced method. The reference method has certain limitations with respect to analytes of this nature.
J	Detected below the Reporting Limit but greater than or equal to the Method Detection Limit (MDL/LOD) or in the case of a TIC, the result is an estimated concentration.
ICVE	The value reported is ESTIMATED. The value is estimated due to its behavior during initial calibration verification (recovery exceeded 30% of expected value).
CCVE	The value reported is ESTIMATED. The value is estimated due to its behavior during continuing calibration verification (>20% Difference for average Rf or >20% Drift for quadratic fit).
CAL-E	The value reported is ESTIMATED. The value is estimated due to its behavior during initial calibration (average Rf>20%)
B	Analyte is found in the associated analysis batch blank. For volatiles, methylene chloride and acetone are common lab contaminants.
/\	Analyte is not certified but the state of sample origination offer certification for the Analyte

Definitions and Other Explanations

*	Analyte is not certified or the state of the samples origination does not offer certification for the Analyte.
ND	NOT DETECTED - the analyte is not detected at the Reported to level (LOQ/RL or LOD/MDL)
RL	REPORTING LIMIT - the minimum reportable value based upon the lowest point in the analyte calibration curve.
LOQ	LIMIT OF QUANTITATION - the minimum concentration of a target analyte that can be reported within a specified degree of confidence. This is the lowest point in an analyte calibration curve that has been subjected to all steps of the processing/analysis and verified to meet defined criteria. This is based upon NELAC 2009 Standards and applies to all analyses.
LOD	LIMIT OF DETECTION - a verified estimate of the minimum concentration of a substance in a given matrix that an analytical process can reliably detect. This is based upon NELAC 2009 Standards and applies to all analyses conducted under the auspices of EPA SW-846.
MDL	METHOD DETECTION LIMIT - a statistically derived estimate of the minimum amount of a substance an analytical system can reliably detect with a 99% confidence that the concentration of the substance is greater than zero. This is based upon 40 CFR Part 136 Appendix B and applies only to EPA 600 and 200 series methods.
Reported to	This indicates that the data for a particular analysis is reported to either the LOD/MDL, or the LOQ/RL. In cases where the "Reported to" is located above the LOD/MDL, any value between this and the LOQ represents an estimated value which is "J" flagged accordingly. This applies to volatile and semi-volatile target compounds only.
NR	Not reported
RPD	Relative Percent Difference
Wet	The data has been reported on an as-received (wet weight) basis
Low Bias	Low Bias flag indicates that the recovery of the flagged analyte is below the laboratory or regulatory lower control limit. The data user should take note that this analyte may be biased low but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
High Bias	High Bias flag indicates that the recovery of the flagged analyte is above the laboratory or regulatory upper control limit. The data user should take note that this analyte may be biased high but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
Non-Dir.	Non-dir. flag (Non-Directional Bias) indicates that the Relative Percent Difference (RPD) (a measure of precision) among the MS and MSD data is outside the laboratory or regulatory control limit. This alerts the data user where the MS and MSD are from site-specific samples that the RPD is high due to either non-homogeneous distribution of target analyte between the MS/MSD or indicates poor reproducibility for other reasons.

If EPA SW-846 method 8270 is included herein it is noted that the target compound N-nitrosodiphenylamine (NDPA) decomposes in the gas chromatographic inlet and cannot be separated from diphenylamine (DPA). These results could actually represent 100% DPA, 100% NDPA or some combination of the two. For this reason, ALS reports the combined result for n-nitrosodiphenylamine and diphenylamine for either of these compounds as a combined concentration as Diphenylamine.

If Total PCBs are detected and the target aroclors reported are "Not detected", the Total PCB value is reported due to the presence of either or both Aroclors 1262 and 1268 which are non-target aroclors for some regulatory lists.

2-chloroethylvinyl ether readily breaks down under acidic conditions. Samples that are acid preserved, including standards will exhibit breakdown. The data user should take note.

Certification for pH is no longer offered by NYDOH ELAP.

Semi-Volatile and Volatile analyses are reported down to the LOD/MDL, with values between the LOD/MDL and the LOQ being "J" flagged as estimated results.

For analyses by EPA SW-846-8270D, the Limit of Quantitation (LOQ) reported for benzidine is based upon the lowest standard used for calibration and is not a verified LOQ due to this compound's propensity for oxidative losses during extraction/concentration procedures and non-reproducible chromatographic performance.

Field Chain-of-Custody Record

ALS environmental

ALS' Standard Terms & Conditions are listed on the back side of this document. This legal document serves as your written authorization for ALS to proceed with the analyses requested below. Your signature binds you to ALS' Standard Terms & Conditions.

120 Research Drive Stratford, CT 06615 | 132-02 89th Ave Queens, NY 11418 | 56 Church Hill Rd. #2 Newtown, CT 06470 | 2161 Whitesville Rd Toms River, NJ 08755 | clientservices@yorklab.com | 800-306-YORK | 800-306-9675

ALS Project Number: 26A1278

Page 1 of 1

Report To:	Invoice To:
Company: Langan NYC	Company:
Address: 368 Ninth Avenue, 8th floor New York, NY 10001	Address: SAME
Phone.: 212-479-5400	Phone.:
Contact: Ellie Seery	Contact:
E-mail: ESEERY@Langan.com	E-mail:

YOUR Project Name / Number: Willets Point Development L-Parcel 1701976.05

PO Number:

Samples Collected From: NY X | CT | NJ | PA | Other: (please specify)

Turn-Around Time: RUSH - Next Day | RUSH - Two Day | RUSH - Three Day | RUSH - Four Day | RUSH - Five Day | Standard (6-9 Day) X | PFAS Standard 7-10 Day

Please print clearly and legibly. All information must be complete. Samples will not be logged in and the turn-around-time clock will not begin until any questions by ALS are resolved.

Olivia O'Donnell

Samples Collected by: (print AND sign your name)

Matrix Codes: S - soil/solid/sludge; GW - groundwater; DW - drinking water; SW - surface water; WW - wastewater; O - Oil; Other

Preservative (please list number of containers)

Sample Identification	Date	Time	Matrix	Unpreserved	HCl (hydrochloric acid)	MeOH (methanol)	HNO_3 (nitric acid)	H_2SO_4 (sulfuric acid)	NaOH (sodium hydroxide)	$Na_2S_2O_3$ (sodium thio.)	Trizma	Ammonium Acetate	Other:	Part 375 TCL VOCs	SVOCs	TOC	Grab or Comp.
TS03-el-1-3	1/29/26	8:50	S			X								X	X	X	G/C
TS02-el-1-3		9:30															
TS01-el-4-6		11:15															

Report Type (circle): QA Report | Summary (Results Only) | NY ASP B Package | NJ Reduced | NJ DKQP | NJ Full | CT RCP

EDD Type (circle): EQuIS (standard) | NYSDEC EQuIS | NJDEP SRP Haz Site | Standard Excel | CMDP | Other:

Regulatory Comparative: Compared to the following Regulation(s): (please fill in)

Field Filtered | Lab Filtered

Comments:

CC datamanagement@langan.com, ESEERY@LANGAN.COM, BBURGESS@Langan.com & LCLEMENTS@Langan.com on all deliverables

Samples iced/chilled at time of lab pickup? circle Yes or No

Lab Sample Receiving Checklist (to be completed by the receiving laboratory only) Circle Y / N

Custody Seals: Y / N | Containers Intact: Y / N | COC/Labels Agree: Y / N | Preservation Confirmed: Y / N
COC Complete: Y / N | COC Received: Y / N | Appropriate Sample Volumes: Y / N | Appropriate Sample Containers: Y / N
Cooler Temperature Confirmed: Y / N | Samples Submitted within Holding Times: Y / N | Corrective Action Form Required: Y / N

Samples Relinquished by / Company	Date/Time	1. Samples Received by / Company	Date/Time	2. Samples Relinquished by / Company	Date/Time
Olivia O'Donnell	1/29/26 19:11		1/29/26 15:15		1/29/26 16:05
Samples Received by / Company	Date/Time	3. Samples Relinquished by / Company	Date/Time	3. Samples Received by / Company	Date/Time
	1/29/26 16:05		1/29/26 18:00		1-29-26 18:00
Samples Relinquished by / Company	Date/Time	4. Samples Received by / Company	Date/Time	Samples Received in LAB by	Date/Time / Temperature
	1-29-26 20:00				1/29/26 20:00 / 3.5 Degrees C

February 06, 2026 Service Request No:R2601319

ALS Environmental - Stratford
120 Research Drive
Stratford, CT 06615

Laboratory Results for: 26A1278

Dear Reporting-Strafford,

Enclosed are the results of the sample(s) submitted to our laboratory February 02, 2026
For your reference, these analyses have been assigned our service request number **R2601319.**

All testing was performed according to our laboratory's quality assurance program and met the requirements of the TNI standards except as noted in the case narrative report. Any testing not included in the lab's accreditation is identified on a Non-Certified Analytes report. All results are intended to be considered in their entirety. ALS Environmental is not responsible for use of less than the complete report. Results apply only to the individual samples submitted to the lab for analysis, as listed in the report. The measurement uncertainty of the results included in this report is within that expected when using the prescribed method(s), and represented by Laboratory Control Sample control limits. Any events, such as QC failures or Holding Time exceedances, which may add to the uncertainty are explained in the report narrative or are flagged with qualifiers. The flags are explained in the Report Qualifiers and Definitions page of this report.

Please contact me if you have any questions. My extension is 7475. You may also contact me via email at Meghan.Pedro@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Meghan Pedro
Project Manager

ADDRESS 1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
PHONE +1 585 288 5380 | FAX +1 585 288 8475
ALS Group USA, Corp.
dba ALS Environmental

Narrative Documents

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

Client: ALS Environmental - (Formerly York)
Project: 26A1278
Sample Matrix: Soil

Service Request: R2601319
Date Received: 02/02/2026

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier level IV requested by the client.
Manual Integrations may have been used in the quantitation of the results in this report. Manual Integrations are readily identified in the raw data on the Quantitation Reports (Organics) by the automatic placement of an “m” next to the sample result. For Ion Chromatography, the manual integrations are identified by the automatic placement of “manipulated” or "manually integrated" in the upper left corner of the chromatogram (Hexavalent Chromium) or “M” by the result in the “Type” column (anions). The reason for the manual integration is noted on the “after” chromatogram, which is found with the original chromatogram and quantitation report. All integrations follow the lab SOP ADM-INT “Manual Integration.”

Sample Receipt:

Three soil samples were received for analysis at ALS Environmental on 02/02/2026. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The samples were stored at minimum in accordance with the analytical method requirements.

General Chemistry:

No significant anomalies were noted with this analysis.

Approved by Meghan Pedro Date 02/06/2026

Sample Receipt Information

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
R2601319-001	26A1278-01	1/29/2026	0850
R2601319-002	26A1278-02	1/29/2026	0930
R2601319-003	26A1278-03	1/29/2026	1115

R2601319 5
ALS Environmental - Stratford
26A1278

SUBCONTRACT Notification, Purchase Order and Chain-of-Custody

Project No.: 26A1278

This information is being sent to inform you that ALS-Stratford intends to subcontract certain samples to another licensed laboratory for specific parameters that we cannot perform in-house. The specific paramters that will be subcontracted are detailed below. Do not contact the subcontract laboratory directly. Please contact your project manager for further information.

E-mail lab reports to: USAEnviro.Stratford@alsglobal.com Sample confirmations to: NASTR.Subcontract@alsglobal.com
Mail Hard Copies to: The address below

SENDING LABORATORY:

ALS Environmental - Stratford
120 Research Dr
Stratford, CT 06615
Phone: 203.325.1371

RECEIVING LABORATORY:

ALS-Rochester
1565 W Jefferson Rd Suite 360,
Rochester,, NY 14623
Phone :(000) 000-0000

Sample ID: TS03_EL_1-3 **ALS Ref: 26A1278-01**

Matrix: Soil Date Sampled : 01/29/2026 08:50

Analysis Needed	Date Due	Holding Time Expires	Comments
Total Organic Carbon (TOC-SUB)	02/06/2026 19:00	02/12/2026 08:50	

Containers Supplied:
06_4 oz. Glass Cool to 4° C (F)

Sample ID: TS02_EL_1-3 **ALS Ref: 26A1278-02**

Matrix: Soil Date Sampled : 01/29/2026 09:30

Analysis Needed	Date Due	Holding Time Expires	Comments
Total Organic Carbon (TOC-SUB)	02/06/2026 19:00	02/12/2026 09:30	

Containers Supplied:
06_4 oz. Glass Cool to 4° C (F)

Purchase Order No.: 26A1278
Deliverables required: NY ASP B Package
EDDs required: NYSDEC

Samples from State of: NY
Collected by: Olivia O'Donnell

Data Pkg DUE:
Special Info:
Reporting level: MDL/LOD

Chain-of-Custody Information

Carolina Fernandez	1/29/2026	Chris C 1-30-26	6:30 PM
Released By ALS-Stratford Sample Control	Date	Received By	Date
Chris C 1-30-26		Mark O'Kelly	1/30/26
Received By	Date	Received in Subcontract Lab By	Date
Rel.			
Relinquished Bill Lindley ALS 2/2/26	14:46	Received 2/2/26	14:46

1/29/2026

SUBCONTRACT Notification, Purchase Order and Chain-of-Custody

Project No.: 26A1278

This information is being sent to inform you that ALS-Stratford intends to subcontract certain samples to another licensed laboratory for specific parameters that we cannot perform in-house. The specific paramters that will be subcontracted are detailed below. Do not contact the subcontract laboratory directly. Please contact your project manager for further information.

E-mail lab reports to: USAEnviro.Stratford@alsglobal.com **Sample confirmations to:** NASTR.Subcontract@alsglobal.com
Mail Hard Copies to: The address below

Sample ID: TS01_EL_4-6 **ALS Ref: 26A1278-03**

Matrix: Soil **Date Sampled :** 01/29/2026 11:15

Analysis Needed	Date Due	Holding Time Expires	Comments
Total Organic Carbon (TOC-SUB)	02/06/2026 19:00	02/12/2026 11:15	

Containers Supplied:
06_4 oz. Glass Cool to 4° C (F)

Purchase Order No.: 26A1278
Deliverables required: NY ASP B Package
EDDs required: NYSDEC

Samples from State of: NY
Collected by: Olivia O'Donnell

Data Pkg DUE:
Special Info:
Reporting level: MDL/LOD

Chain-of-Custody Information

Released By ALS-Stratford Sample Control	Date	Received By	Date
Carolina Fernandez	1/29/2026	Chris C 1-30-26	6:30 am
Chris C 1-30-26		Mark O'Key	1/30/26
~~Received~~ By	Date	Received in Subcontract Lab By	Date
RJ.			

Relinquished: ALS 2/2/26 14:46 2/2/26 14:46

Cooler Receipt and Preservation Ch

R2601319 5
ALS Environmental - Stratford
26A1278

Project/Client York Analytical Folder Number

Cooler received on 2/2/26 by: RM COURIER: ALS VELOCITY CLIENT

1	Were **Custody seals** on outside of cooler?	Y (N)		5a	Did **VOA** vials have sig* **bubbles?**	Y (N) NA
2	**Custody papers** properly completed (ink, signed)?	(Y) N		5b	Sig* bubbles: **Alk?** Y (N) NA **Sulfide?**	Y N (NA)
3	Did all bottles arrive in good **condition** (unbroken)?	(Y) N		6	Where did the bottles originate? ALS/ROC	CLIENT
4	Circle: (**Wet Ice**) **Dry Ice** **Gel packs** present?	(Y) N		7	Soil VOA received as: Bulk Encore 5035set	NA

8. Temperature Readings Date: 2/2/26 Time: 14:49 ID: IR#11 IR#12 (IR#13) From: Temp Blank (Sample Bottle)

Temp (°C)	5.7	1.4					
Within 0-6°C?	(Y) N	(Y) N	Y N	Y N	Y N	Y N	Y N
If <0°C, were samples frozen?	Y N	Y N	Y N	Y N	Y N	Y N	Y N

If out of Temperature, note packing/ice condition: _____ Ice melted Poorly Packed (described below) Same Day Rule

&Client Approval to Run Samples: _____ Standing Approval Client aware at drop-off Client notified by: _____

All samples held in storage location: SMO by RM on 2/2 at 15:38
5035 samples placed in storage location: _____ by _____ on _____ at _____ within 48 hours of sampling? Y N

Cooler Breakdown/Preservation Check**: Date: 2/2 Time: 1657 by: AG

9. Were all bottle labels complete (*i.e.* analysis, preservation, etc.)? (YES) NO
10. Did all bottle labels and tags agree with custody papers? (YES) NO
11. Were correct containers used for the tests indicated? (YES) NO
12. Were 5035 vials acceptable (no extra labels, not leaking)? YES NO (N/A)
13. Were dissolved metals filtered in the field? YES NO (N/A)

pH	Lot of test paper	Reagent	Preserved? Yes	Preserved? No	Lot Received	Exp	Sample ID Adjusted	Vol. Added	Lot Added	Final pH
≥12		NaOH								
≤2		HNO_3								
≤2		H_2SO_4								
<4		$NaHSO_4$								
~~5-9~~		~~For 608pest~~			~~No=Notify for 3day~~					
Residual Chlorine (-)		For CN, Phenol, 625, 608pest, 522			If +, contact PM to add $Na_2S_2O_3$ (625, 608, CN), ascorbic (phenol).					
		$Na_2S_2O_3$								
		ZnAcetate	-	-						
		HCl	**	**						

**VOAs and 1664 Not to be tested before analysis. Otherwise, all bottles of all samples with chemical preservatives are checked (not just representatives).

Bottle lot numbers: _____
Explain all Discrepancies/ Other Comments:

HPROD	BULK
HTR	FLDT
SUB	HGFB
ALS	LL3541

Labels secondary reviewed by: AG *significant air bubbles: VOA > 5-6 mm : WC >1 in. diameter

Miscellaneous Forms

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

REPORT QUALIFIERS AND DEFINITIONS

U	Analyte was analyzed for but not detected. The sample quantitation limit has been corrected for dilution and for percent moisture, unless otherwise noted in the case narrative.
J	Estimated value due to either being a Tentatively Identified Compound (TIC) or that the concentration is between the MRL and the MDL. Concentrations are not verified within the linear range of the calibration. For DoD: concentration >40% difference between two GC columns (pesticides/Arclors).
B	Analyte was also detected in the associated method blank at a concentration that may have contributed to the sample result.
E	Inorganics- Concentration is estimated due to the serial dilution was outside control limits.
E	Organics- Concentration has exceeded the calibration range for that specific analysis.
D	Concentration is a result of a dilution, typically a secondary analysis of the sample due to exceeding the calibration range or that a surrogate has been diluted out of the sample and cannot be assessed.
*	Indicates that a quality control parameter has exceeded laboratory limits. Under the "Notes" column of the Form I, this qualifier denotes analysis was performed out of Holding Time.
H	Analysis was performed out of hold time for tests that have an "immediate" hold time criteria.
#	Spike was diluted out.
+	Correlation coefficient for MSA is <0.995.
N	Inorganics- Matrix spike recovery was outside laboratory limits.
N	Organics- Presumptive evidence of a compound (reported as a TIC) based on the MS library search.
S	Concentration has been determined using Method of Standard Additions (MSA).
W	Post-Digestion Spike recovery is outside control limits and the sample absorbance is <50% of the spike absorbance.
P	Concentration >40% difference between the two GC columns.
C	Confirmed by GC/MS
Q	DoD reports: indicates a pesticide/Aroclor is not confirmed (≥100% Difference between two GC columns).
X	See Case Narrative for discussion.
MRL LOQ	Method Reporting Limit. Also known as: Limit of Quantitation (LOQ) The lowest concentration at which the method analyte may be reliably quantified under the method conditions.
MDL	Method Detection Limit. A statistical value derived from a study designed to provide the lowest concentration that will be detected 99% of the time. Values between the MDL and MRL are estimated (see J qualifier).
LOD	Limit of Detection. A value at or above the MDL which has been verified to be detectable.
ND	Non-Detect. Analyte was not detected at the concentration listed. Same as U qualifier.

Rochester Lab ID # for State Accreditations[1]

NELAP States
Florida ID # E87674
New Hampshire ID # 2941
New York ID # 10145
Pennsylvania ID# 68-786
Texas ID#T104704581
Virginia #460167

Non-NELAP States
Connecticut ID #PH0556
Delaware Approved
Maine ID #NY01587
North Carolina #36701
North Carolina #676
Rhode Island LAO00333

[1] Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state or agency requirements. The test results meet requirements of the current NELAP/TNI standards or state or agency requirements, where applicable, except as noted in the case narrative. Since not all analyte/method/matrix combinations are offered for state/NELAC accreditation, this report may contain results which are not accredited. For a specific list of accredited analytes, contact the laboratory. To verify NH accredited analytes, go to https://www4.des.state.nh.us/CertifiedLabs/Certified-Method.aspx.

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Client: ALS Environmental - (Formerly York) **Service Request:** R2601319
Project: 26A1278/

Sample Name: 26A1278-01 **Date Collected:** 01/29/26
Lab Code: R2601319-001 **Date Received:** 02/2/26
Sample Matrix: Soil

Analysis Method	Extracted/Digested By	Analyzed By
EPA LKahn 7-27-1988		SBIRNBERG

Sample Name: 26A1278-02 **Date Collected:** 01/29/26
Lab Code: R2601319-002 **Date Received:** 02/2/26
Sample Matrix: Soil

Analysis Method	Extracted/Digested By	Analyzed By
EPA LKahn 7-27-1988		SBIRNBERG

Sample Name: 26A1278-03 **Date Collected:** 01/29/26
Lab Code: R2601319-003 **Date Received:** 02/2/26
Sample Matrix: Soil

Analysis Method	Extracted/Digested By	Analyzed By
EPA LKahn 7-27-1988		SBIRNBERG

PREPARATION METHODS

The preparation methods associated with this report are found in these tables unless discussed in the case narrative.

INORGANIC

Water/Liquid Matrix

Analytical Method	Preparation Method
200.7 / 200.8	200.2
6010D	3005A/3010A
6020B	ILM05.3
9034 Sulfide Acid Soluble	9030B
SM 4500-CN-N-2016 Amenable and Residual Cyanide	SM 4500-CN-G and SM 4500-CN-B,C-2016
SM 4500-CN-E WAD Cyanide	SM 4500-CN-I

Solid/Soil/Non-Aqueous Matrix

Analytical Method	Preparation Method
6010D	3050B
6010D TCLP (1311) extract	3005A/3010A
6010D SPLP (1312) extract	3005A/3010A
7199	3060A
300.0 Anions/ 350.1/ 353.2/ SM 2320B/ SM 5210B/ 9056A Anions	DI extraction
For analytical methods not listed, the preparation method is the same as the analytical method reference.	

ORGANIC

Preparation Methods for Organic methods are listed in the header of the Results pages.

Regarding "Bulk/5035A":
For soil/solid samples submitted in soil jars for Volatiles analysis, the prep method is listed as "Bulk/5035A". The lab follows the closed-system EPA 5035A protocols once the sample is transferred to a sealed vial, but collection in bulk in soil jars does not follow the collection protocols listed in EPA 5035A. In accordance with the NYSDOH technical notice of October 2012, all results or reporting limits <200 ug/kg are to be considered estimated due to potential low bias.

Sample Results

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

General Chemistry

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

Analytical Report

Client:	ALS Environmental - (Formerly York)	**Service Request:**	R2601319
Project:	26A1278	**Date Collected:**	01/29/26 08:50
Sample Matrix:	Soil	**Date Received:**	02/02/26 14:45
Sample Name:	26A1278-01	**Basis:**	Dry, per Method
Lab Code:	R2601319-001		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Carbon, Total Organic (TOC)	EPA LKahn 7-27-1988	**74900**	mg/Kg	5700	5700	1	02/04/26 14:31	

Analytical Report

Client:	ALS Environmental - (Formerly York)	**Service Request:**	R2601319
Project:	26A1278	**Date Collected:**	01/29/26 09:30
Sample Matrix:	Soil	**Date Received:**	02/02/26 14:45
Sample Name:	26A1278-02	**Basis:**	Dry, per Method
Lab Code:	R2601319-002		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Carbon, Total Organic (TOC)	EPA LKahn 7-27-1988	**41200**	mg/Kg	2900	2900	1	02/04/26 14:42	

Analytical Report

Client:	ALS Environmental - (Formerly York)	**Service Request:**	R2601319
Project:	26A1278	**Date Collected:**	01/29/26 11:15
Sample Matrix:	Soil	**Date Received:**	02/02/26 14:45
Sample Name:	26A1278-03	**Basis:**	Dry, per Method
Lab Code:	R2601319-003		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Carbon, Total Organic (TOC)	EPA LKahn 7-27-1988	**47200**	mg/Kg	6700	6700	1	02/04/26 14:50	

QC Summary Forms

ALS Environmental—Rochester Laboratory
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General Chemistry

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1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

Analytical Report

Client:	ALS Environmental - (Formerly York)	**Service Request:**	R2601319
Project:	26A1278	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
Sample Name:	Method Blank	**Basis:**	Dry, per Method
Lab Code:	R2601319-MB		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Q
Carbon, Total Organic (TOC)	EPA LKahn 7-27-1988	ND U	mg/Kg	300	300	1	02/04/26 14:08	

Client:	ALS Environmental - (Formerly York)	**Service Request:**	R2601319
Project:	26A1278	**Date Collected:**	01/29/26
Sample Matrix:	Soil	**Date Received:**	02/02/26
		Date Analyzed:	02/4/26

Matrix Spike Summary
Carbon, Total Organic (TOC)

Sample Name:	26A1278-03	**Units:**	mg/Kg
Lab Code:	R2601319-003	**Basis:**	Dry, per Method
Analysis Method:	EPA LKahn 7-27-1988		

Matrix Spike
R2601319-003MS

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Carbon, Total Organic (TOC)	47200	85200	50000	76	27-162

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Matrix Spike and Matrix Spike Duplicate Data is presented for information purposes only. The matrix may or may not be relevant to samples reported in this report. The laboratory evaluates system performance based on the LCS and LCSD control limits.

Client:	ALS Environmental - (Formerly York)	**Service Request:**	R2601319
Project	26A1278	**Date Collected:**	01/29/26
Sample Matrix:	Soil	**Date Received:**	02/02/26
		Date Analyzed:	02/04/26

Replicate Sample Summary
General Chemistry Parameters

Sample Name:	26A1278-03	**Units:**	mg/Kg
Lab Code:	R2601319-003	**Basis:**	Dry, per Method

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample R2601319-003DUP Result	Average	RPD	RPD Limit
Carbon, Total Organic (TOC)	EPA LKahn 7-27-1988	5700	5700	47200	47700	47500	1	30

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Client: ALS Environmental - (Formerly York)
Project: 26A1278
Sample Matrix: Soil

Service Request: R2601319
Date Analyzed: 02/04/26

Lab Control Sample Summary
General Chemistry Parameters

Units:mg/Kg
Basis: Dry, per Method

Lab Control Sample
R2601319-LCS

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Carbon, Total Organic (TOC)	EPA LKahn 7-27-1988	1930	2000	96	75-127

Client:	ALS Environmental - (Formerly York)	**Service Request:**	R2601319
Project	26A1278	**Date Collected:**	01/29/26
Sample Matrix:	Soil	**Date Received:**	02/02/26
		Date Analyzed:	02/04/26

Triplicate Sample Summary
General Chemistry Parameters

Sample Name:	26A1278-03	**Units:**	mg/Kg
Lab Code:	R2601319-003	**Basis:**	Dry, per Method
Analysis Method:	EPA LKahn 7-27-1988		

Analyte Name	MRL	MDL	Sample Result	Duplicate R2601319-003DUP Result	Triplicate R2601319-003TRP Result	Average	RSD	RSD Limit
Carbon, Total Organic (TOC)	6300	6300	47200	47700	42900	45900	6	30

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Printed 2/6/2026 2:44:50 PM

SuperSet Reference:26-0000760521 rev 00

Client:	ALS Environmental - (Formerly York)	**Service Request:**	R2601319
Project	26A1278	**Date Collected:**	01/29/26
Sample Matrix:	Soil	**Date Received:**	02/02/26
		Date Analyzed:	02/04/26

Quadruplicate Sample Summary
General Chemistry Parameters

Sample Name:	26A1278-03	**Units:**	mg/Kg
Lab Code:	R2601319-003	**Basis:**	Dry, per Method
Analysis Method:	EPA LKahn 7-27-1988		

Analyte Name	LOQ	MDL	Sample Result	Duplicate R2601319-003DUP Result	Triplicate R2601319-003TRP Result	Quadruplicate R2601319-003QUAD Result	Average	RSD	RSD Limit
Carbon, Total Organic (TOC)	6200	6200	47200	47700	42900	41400	44800	7	30.8

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Technical Report

prepared for:

Langan Engineering & Environmental Services (NYC)
21 Penn Plaza, 360 West 31st Street
New York NY, 10001
Attention: Ellie Seery

Report Date: 02/11/2026
Client Project ID: 170197605
Project (SDG) No.: 26A1333

Report Date: 02/11/2026
Client Project ID: 170197605
Project (SDG) No.: 26A1333

Langan Engineering & Environmental Services (NYC)
21 Penn Plaza, 360 West 31st Street
New York NY, 10001
Attention: Ellie Seery

Purpose and Results

This report contains the analytical data for the sample(s) identified on the attached chain-of-custody received in our laboratory on January 30, 2026 and listed below. The project was identified as your project: **170197605**.

The analyses were conducted utilizing appropriate EPA, Standard Methods, and ASTM methods as detailed in the data summary tables.

All samples were received in proper condition meeting the customary acceptance requirements for environmental samples except those indicated under the Sample and Analysis Qualifiers section of this report.

All analyses met the method and laboratory standard operating procedure requirements except as indicated by any data flags, the meaning of which are explained in the Sample and Data Qualifiers Relating to This Work Order section of this report and case narrative if applicable.

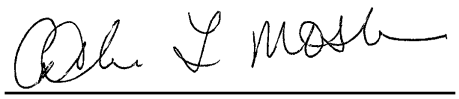
The results of the analyses, which are all reported on dry weight basis (soils) unless otherwise noted, are detailed in the following pages.

Please contact Client Services at 203.325.1371 with any questions regarding this report.

Sample ID	Client Sample ID	Matrix	Date Collected	Date Received
26A1333-01	J-MW118_013026	Ground Water	01/30/2026	01/30/2026

General Notes for Project (SDG) No.: 26A1333

1. The RLs and MDLs (Reporting Limit and Method Detection Limit respectively) reported are adjusted for any dilution necessary due to the levels of target and/or non-target analytes and matrix interference. The RL(REPORTING LIMIT) is based upon the lowest standard utilized for the calibration where applicable.
2. Samples are retained for a period of thirty days after submittal of report, unless other arrangements are made.
3. ALS' liability for the above data is limited to the dollar value paid to ALS for the referenced project.
4. This report shall not be reproduced without the written approval of ALS, Inc.
5. All analyses conducted met method or Laboratory SOP requirements. See the Sample and Data Qualifiers Section for further information.
6. It is noted that no analyses reported herein were subcontracted to another laboratory, unless noted in the report.
7. This report reflects results that relate only to the samples submitted on the attached chain-of-custody form(s) received by ALS.
8. Analyses conducted at ALS, Inc. Stratford, CT are indicated by NY Cert. No. 10854; those conducted at ALS, Inc., Richmond Hill, NY are indicated by NY Cert. No. 12058.

Approved By: 

Cassie Mosher
Laboratory Manager - Stratford

Date: 02/11/2026

Sample Information

Client Sample ID: J-MW118_013026 **Sample ID:** 26A1333-01

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1333	170197605	Ground Water	January 30, 2026 10:30 am	01/30/2026

VOA, 8260 LOW MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND		ug/L	0.216	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-55-6	1,1,1-Trichloroethane	ND		ug/L	0.266	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-34-5	1,1,2,2-Tetrachloroethane	ND		ug/L	0.256	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		ug/L	0.286	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-00-5	1,1,2-Trichloroethane	ND		ug/L	0.249	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-34-3	1,1-Dichloroethane	ND		ug/L	0.272	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-35-4	1,1-Dichloroethylene	ND		ug/L	0.327	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-61-6	1,2,3-Trichlorobenzene	ND		ug/L	0.222	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
96-18-4	1,2,3-Trichloropropane	ND		ug/L	0.273	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
120-82-1	1,2,4-Trichlorobenzene	ND		ug/L	0.138	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
95-63-6	**1,2,4-Trimethylbenzene**	**221**		ug/L	7.75	12.5	25	EPA 8260D	02/11/2026 08:00	02/11/2026 12:35	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
96-12-8	1,2-Dibromo-3-chloropropane	ND		ug/L	0.432	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-93-4	1,2-Dibromoethane	ND		ug/L	0.215	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-50-1	**1,2-Dichlorobenzene**	**3.60**		ug/L	0.270	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-06-2	1,2-Dichloroethane	ND		ug/L	0.377	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-87-5	1,2-Dichloropropane	ND		ug/L	0.327	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-67-8	**1,3,5-Trimethylbenzene**	**76.7**		ug/L	0.347	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
541-73-1	1,3-Dichlorobenzene	ND		ug/L	0.283	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
106-46-7	1,4-Dichlorobenzene	ND		ug/L	0.311	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
78-93-3	**2-Butanone**	**4.69**	ICVE, QL-02	ug/L	0.421	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: J-MW118_013026 **Sample ID:** 26A1333-01

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1333	170197605	Ground Water	January 30, 2026 10:30 am	01/30/2026

VOA, 8260 LOW MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
591-78-6	2-Hexanone	ND	ICVE, QL-02	ug/L	0.320	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-10-1	**4-Methyl-2-pentanone**	**18.9**	ICVE, QL-02	ug/L	0.365	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-64-1	**Acetone**	**32.2**	ICVE	ug/L	1.34	2.00	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-02-8	Acrolein	ND	ICVE	ug/L	0.447	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
107-13-1	Acrylonitrile	ND		ug/L	0.422	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
71-43-2	**Benzene**	**98.5**		ug/L	6.98	12.5	25	EPA 8260D	02/11/2026 08:00	02/11/2026 12:35	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-97-5	Bromochloromethane	ND		ug/L	0.354	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
75-27-4	Bromodichloromethane	ND		ug/L	0.245	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-25-2	Bromoform	ND		ug/L	0.163	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-83-9	Bromomethane	ND	CCVE	ug/L	0.500	2.00	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-15-0	**Carbon disulfide**	**4.16**		ug/L	0.362	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
56-23-5	Carbon tetrachloride	ND		ug/L	0.204	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-90-7	Chlorobenzene	ND		ug/L	0.284	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-00-3	Chloroethane	ND		ug/L	0.448	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
67-66-3	Chloroform	ND		ug/L	0.243	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-87-3	Chloromethane	ND	CCVE	ug/L	0.372	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-59-2	**cis-1,2-Dichloroethylene**	**0.310**		ug/L	0.294	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-01-5	cis-1,3-Dichloropropylene	ND		ug/L	0.262	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
110-82-7	**Cyclohexane**	**14.5**		ug/L	0.491	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
124-48-1	Dibromochloromethane	ND		ug/L	0.146	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
74-95-3	Dibromomethane	ND		ug/L	0.203	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		

Sample Information

Client Sample ID: J-MW118_013026 **Sample ID:** 26A1333-01

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1333	170197605	Ground Water	January 30, 2026 10:30 am	01/30/2026

VOA, 8260 LOW MASTER **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-71-8	Dichlorodifluoromethane	ND	CCVE	ug/L	0.451	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
100-41-4	**Ethyl Benzene**	**154**		ug/L	7.25	12.5	25	EPA 8260D	02/11/2026 08:00	02/11/2026 12:35	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
87-68-3	Hexachlorobutadiene	ND		ug/L	0.241	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	NYSDOH-NY12058,PADEP-68-04440		
98-82-8	**Isopropylbenzene**	**14.6**		ug/L	0.405	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
79-20-9	Methyl acetate	ND		ug/L	0.442	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
1634-04-4	**Methyl tert-butyl ether (MTBE)**	**478**	QL-02	ug/L	6.10	12.5	25	EPA 8260D	02/11/2026 08:00	02/11/2026 12:35	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-87-2	**Methylcyclohexane**	**7.99**		ug/L	0.477	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
75-09-2	Methylene chloride	ND		ug/L	0.397	2.00	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
104-51-8	n-Butylbenzene	ND		ug/L	0.399	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
103-65-1	**n-Propylbenzene**	**31.7**		ug/L	0.384	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
95-47-6	**o-Xylene**	**296**		ug/L	6.52	12.5	25	EPA 8260D	02/11/2026 08:00	02/11/2026 12:35	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
179601-23-1	**p- & m- Xylenes**	**599**		ug/L	14.4	25.0	25	EPA 8260D	02/11/2026 08:00	02/11/2026 12:35	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,PADEP		
99-87-6	**p-Isopropyltoluene**	**1.71**		ug/L	0.377	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
135-98-8	**sec-Butylbenzene**	**2.60**		ug/L	0.444	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
100-42-5	Styrene	ND		ug/L	0.255	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-65-0	**tert-Butyl alcohol (TBA)**	**587**		ug/L	15.2	25.0	25	EPA 8260D	02/11/2026 08:00	02/11/2026 12:35	THD
								Certifications:	NYSDOH-NY10854,NYSDOH-NY12058,NJDEP-CT005,PADEP-68		
98-06-6	tert-Butylbenzene	ND		ug/L	0.367	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
127-18-4	Tetrachloroethylene	ND	CCVE, ICVE, QL-02	ug/L	0.239	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
108-88-3	**Toluene**	**370**		ug/L	8.65	12.5	25	EPA 8260D	02/11/2026 08:00	02/11/2026 12:35	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
156-60-5	trans-1,2-Dichloroethylene	ND		ug/L	0.279	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
10061-02-6	trans-1,3-Dichloropropylene	ND		ug/L	0.229	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

Sample Information

Client Sample ID: J-MW118_013026 **Sample ID:** 26A1333-01

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1333	170197605	Ground Water	January 30, 2026 10:30 am	01/30/2026

VOA, 8260 LOW MASTER

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
79-01-6	**Trichloroethylene**	**0.370**		ug/L	0.249	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-69-4	Trichlorofluoromethane	ND		ug/L	0.337	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
75-01-4	Vinyl Chloride	ND	CCVE	ug/L	0.469	0.500	1	EPA 8260D	02/10/2026 11:55	02/10/2026 16:16	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		
1330-20-7	**Xylenes, Total**	**895**		ug/L	21.0	37.5	25	EPA 8260D	02/11/2026 08:00	02/11/2026 12:35	THD
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,NYSDOH-NY12058,NJDEP		

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: SURR: 1,2-Dichloroethane-d4*	*101 %*	*69-130*
2037-26-5	*Surrogate: SURR: Toluene-d8*	*98.9 %*	*81-117*
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*102 %*	*79-122*

SVOA, 8270 LOW MASTER

Log-in Notes:

Sample Notes: EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
92-52-4	1,1-Biphenyl	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
95-94-3	1,2,4,5-Tetrachlorobenzene	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	NYSDOH-NY10854,PADEP-68-04440		
122-66-7	1,2-Diphenylhydrazine (as Azobenzene)	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
58-90-2	2,3,4,6-Tetrachlorophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	NYSDOH-NY10854,PADEP-68-04440		
95-95-4	2,4,5-Trichlorophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
88-06-2	2,4,6-Trichlorophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
120-83-2	2,4-Dichlorophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
105-67-9	2,4-Dimethylphenol	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
51-28-5	* 2,4-Dinitrophenol	ND	CAL-E	ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005		
121-14-2	2,4-Dinitrotoluene	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
606-20-2	2,6-Dinitrotoluene	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
91-58-7	2-Chloronaphthalene	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		

Sample Information

Client Sample ID: J-MW118_013026 **Sample ID:** 26A1333-01

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1333	170197605	Ground Water	January 30, 2026 10:30 am	01/30/2026

SVOA, 8270 LOW MASTER **Log-in Notes:** **Sample Notes:** EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
95-57-8	2-Chlorophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
91-57-6	**2-Methylnaphthalene**	**12.1**		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
95-48-7	2-Methylphenol	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
88-74-4	2-Nitroaniline	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
88-75-5	2-Nitrophenol	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
65794-96-9	* 3- & 4-Methylphenols	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	CTDPH-PH-0840		
91-94-1	3,3-Dichlorobenzidine	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
99-09-2	3-Nitroaniline	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
534-52-1	4,6-Dinitro-2-methylphenol	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
101-55-3	4-Bromophenyl phenyl ether	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
59-50-7	4-Chloro-3-methylphenol	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
106-47-8	4-Chloroaniline	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
7005-72-3	4-Chlorophenyl phenyl ether	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
100-01-6	4-Nitroaniline	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
100-02-7	4-Nitrophenol	ND	CCVE	ug/L	5.00	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
98-86-2	Acetophenone	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
62-53-3	Aniline	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
100-52-7	Benzaldehyde	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
92-87-5	Benzidine	ND		ug/L	5.00	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
65-85-0	Benzoic acid	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
100-51-6	Benzyl alcohol	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		

Sample Information

Client Sample ID: J-MW118_013026 **Sample ID:** 26A1333-01

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1333	170197605	Ground Water	January 30, 2026 10:30 am	01/30/2026

SVOA, 8270 LOW MASTER **Log-in Notes:** **Sample Notes:** EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
85-68-7	Benzyl butyl phthalate	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
111-91-1	Bis(2-chloroethoxy)methane	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
111-44-4	Bis(2-chloroethyl)ether	ND		ug/L	1.00	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
108-60-1	Bis(2-chloroisopropyl)ether	ND	CCVE	ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
105-60-2	Caprolactam	ND	CCVE, ICVE	ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	NJDEP-CT005,NYSDOH-NY10854,PADEP-68-04440		
86-74-8	Carbazole	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		
132-64-9	Dibenzofuran	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
84-66-2	Diethyl phthalate	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
131-11-3	Dimethyl phthalate	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
84-74-2	Di-n-butyl phthalate	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
117-84-0	Di-n-octyl phthalate	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
122-39-4	Diphenylamine	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	NYSDOH-NY10854,PADEP-68-04440		
77-47-4	Hexachlorocyclopentadiene	ND		ug/L	5.00	10.0	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
78-59-1	Isophorone	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
621-64-7	N-nitroso-di-n-propylamine	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
86-30-6	N-Nitrosodiphenylamine	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
108-95-2	Phenol	ND		ug/L	0.750	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	CTDPH-PH-0840,NJDEP-CT005,NYSDOH-NY10854,PADEP-68-0		
110-86-1	Pyridine	ND		ug/L	2.50	5.00	1	EPA 8270E	02/01/2026 06:59	02/03/2026 17:21	ak
								Certifications:	CTDPH-PH-0840,NYSDOH-NY10854,PADEP-68-04440		

	Surrogate Recoveries	Result		Acceptance Range
367-12-4	*Surrogate: SURR: 2-Fluorophenol*	*25.0 %*		*19.7-63.1*
13127-88-3	*Surrogate: SURR: Phenol-d6*	*15.4 %*		*10.1-41.7*
4165-60-0	*Surrogate: SURR: Nitrobenzene-d5*	*47.6 %*	S-08	*50.2-113*
321-60-8	*Surrogate: SURR: 2-Fluorobiphenyl*	*39.1 %*	S-08	*39.9-105*
118-79-6	*Surrogate: SURR: 2,4,6-Tribromophenol*	*57.9 %*		*39.3-151*
1718-51-0	*Surrogate: SURR: Terphenyl-d14*	*54.6 %*		*30.7-106*

Sample Information

Client Sample ID: J-MW118_013026 **Sample ID:** 26A1333-01

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1333	170197605	Ground Water	January 30, 2026 10:30 am	01/30/2026

SVOA, 8270 SIM MASTER **Log-in Notes:** **Sample Notes:** EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	ND		ug/L	0.0500	0.0500	1	EPA 8270E SIM	02/01/2026 07:01	02/03/2026 19:51	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
208-96-8	Acenaphthylene	ND		ug/L	0.0500	0.0500	1	EPA 8270E SIM	02/01/2026 07:01	02/03/2026 19:51	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
120-12-7	* Anthracene	ND		ug/L	0.0500	0.0500	1	EPA 8270E SIM	02/01/2026 07:01	02/03/2026 19:51	SR
								Certifications:			
1912-24-9	* Atrazine	ND		ug/L	0.500	0.500	1	EPA 8270E SIM	02/01/2026 07:01	02/03/2026 19:51	SR
								Certifications:			
56-55-3	Benzo(a)anthracene	ND		ug/L	0.0500	0.0500	1	EPA 8270E SIM	02/01/2026 07:01	02/03/2026 19:51	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
50-32-8	Benzo(a)pyrene	ND		ug/L	0.0500	0.0500	1	EPA 8270E SIM	02/01/2026 07:01	02/03/2026 19:51	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
205-99-2	Benzo(b)fluoranthene	ND		ug/L	0.0500	0.0500	1	EPA 8270E SIM	02/01/2026 07:01	02/03/2026 19:51	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
191-24-2	Benzo(g,h,i)perylene	ND		ug/L	0.0500	0.0500	1	EPA 8270E SIM	02/01/2026 07:01	02/03/2026 19:51	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
207-08-9	Benzo(k)fluoranthene	ND		ug/L	0.0500	0.0500	1	EPA 8270E SIM	02/01/2026 07:01	02/03/2026 19:51	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
117-81-7	* Bis(2-ethylhexyl)phthalate	ND		ug/L	0.500	0.500	1	EPA 8270E SIM	02/01/2026 07:01	02/03/2026 19:51	SR
								Certifications:			
218-01-9	Chrysene	ND		ug/L	0.0500	0.0500	1	EPA 8270E SIM	02/01/2026 07:01	02/03/2026 19:51	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
53-70-3	Dibenzo(a,h)anthracene	ND		ug/L	0.0500	0.0500	1	EPA 8270E SIM	02/01/2026 07:01	02/03/2026 19:51	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
206-44-0	Fluoranthene	ND		ug/L	0.0500	0.0500	1	EPA 8270E SIM	02/01/2026 07:01	02/03/2026 19:51	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
86-73-7	Fluorene	ND		ug/L	0.0500	0.0500	1	EPA 8270E SIM	02/01/2026 07:01	02/03/2026 19:51	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
118-74-1	* Hexachlorobenzene	ND		ug/L	0.0200	0.0200	1	EPA 8270E SIM	02/01/2026 07:01	02/03/2026 19:51	SR
								Certifications:			
87-68-3	* Hexachlorobutadiene	ND	QL-02	ug/L	0.500	0.500	1	EPA 8270E SIM	02/01/2026 07:01	02/03/2026 19:51	SR
								Certifications:			
67-72-1	* Hexachloroethane	ND		ug/L	0.500	0.500	1	EPA 8270E SIM	02/01/2026 07:01	02/03/2026 19:51	SR
								Certifications:			
193-39-5	Indeno(1,2,3-cd)pyrene	ND		ug/L	0.0500	0.0500	1	EPA 8270E SIM	02/01/2026 07:01	02/03/2026 19:51	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
91-20-3	**Naphthalene**	**3.30**		ug/L	0.0500	0.0500	1	EPA 8270E SIM	02/01/2026 07:01	02/03/2026 19:51	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
98-95-3	* Nitrobenzene	ND	CCVE, ICVE	ug/L	0.250	0.250	1	EPA 8270E SIM	02/01/2026 07:01	02/03/2026 19:51	SR
								Certifications:			
62-75-9	* N-Nitrosodimethylamine	ND	QL-02	ug/L	0.500	0.500	1	EPA 8270E SIM	02/01/2026 07:01	02/03/2026 19:51	SR
								Certifications:			

Sample Information

Client Sample ID: J-MW118_013026 **Sample ID:** 26A1333-01

Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
26A1333	170197605	Ground Water	January 30, 2026 10:30 am	01/30/2026

SVOA, 8270 SIM MASTER

Log-in Notes:

Sample Notes: EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
87-86-5	* Pentachlorophenol	ND	QL-02, CCVE	ug/L	0.250	0.250	1	EPA 8270E SIM	02/01/2026 07:01	02/03/2026 19:51	SR
								Certifications:			
85-01-8	Phenanthrene	ND		ug/L	0.0500	0.0500	1	EPA 8270E SIM	02/01/2026 07:01	02/03/2026 19:51	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			
129-00-0	Pyrene	ND		ug/L	0.0500	0.0500	1	EPA 8270E SIM	02/01/2026 07:01	02/03/2026 19:51	SR
								Certifications: NYSDOH-NY10854,PADEP-68-04440,NJDEP-CT005			

Total Organic Carbon

Log-in Notes:

Sample Notes:

Sample Prepared by Method: Analysis Preparation

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
TOC	**Total Organic Carbon (TOC)**	**62.1**		mg/L	1.00	1.00	1	SM 5310B-2014	02/03/2026 09:38	02/03/2026 17:22	JAMT
								Certifications: NYSDOH-NY10854,CTDPH-PH-0840,NJDEP-CT005,PADEP-68-0			

Analytical Batch Summary

Batch ID: BB60001 **Preparation Method:** EPA 3510C **Prepared By:** AM2

Sample ID	Client Sample ID	Preparation Date
26A1333-01	J-MW118_013026	02/01/26
BB60001-BLK1	Blank	02/01/26
BB60001-BS1	LCS	02/01/26
BB60001-BSD1	LCS Dup	02/01/26

Batch ID: BB60002 **Preparation Method:** EPA 3510C **Prepared By:** AM2

Sample ID	Client Sample ID	Preparation Date
26A1333-01	J-MW118_013026	02/01/26
BB60002-BLK2	Blank	02/01/26
BB60002-BS2	LCS	02/01/26

Batch ID: BB60099 **Preparation Method:** Analysis Preparation **Prepared By:** JAMT

Sample ID	Client Sample ID	Preparation Date
26A1333-01	J-MW118_013026	02/03/26
BB60099-BLK1	Blank	02/03/26
BB60099-BS1	LCS	02/03/26
BB60099-DUP1	Duplicate	02/03/26
BB60099-MS1	Matrix Spike	02/03/26
BB60099-MSD1	Matrix Spike Dup	02/03/26

Batch ID: BB60510 **Preparation Method:** EPA 5030B **Prepared By:** THD

Sample ID	Client Sample ID	Preparation Date
26A1333-01	J-MW118_013026	02/10/26
BB60510-BLK1	Blank	02/10/26
BB60510-BS1	LCS	02/10/26
BB60510-BSD1	LCS Dup	02/10/26

Batch ID: BB60604 **Preparation Method:** EPA 5030B **Prepared By:** THD

Sample ID	Client Sample ID	Preparation Date
26A1333-01RE1	J-MW118_013026	02/11/26
BB60604-BLK1	Blank	02/11/26
BB60604-BS1	LCS	02/11/26
BB60604-BSD1	LCS Dup	02/11/26

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BB60510 - EPA 5030B

Blank (BB60510-BLK1) Blank — Prepared & Analyzed: 02/10/2026

1,1,1,2-Tetrachloroethane	ND	0.500	ug/L
1,1,1-Trichloroethane	ND	0.500	"
1,1,2,2-Tetrachloroethane	ND	0.500	"
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.500	"
1,1,2-Trichloroethane	ND	0.500	"
1,1-Dichloroethane	ND	0.500	"
1,1-Dichloroethylene	ND	0.500	"
1,2,3-Trichlorobenzene	ND	0.500	"
1,2,3-Trichloropropane	ND	0.500	"
1,2,4-Trichlorobenzene	ND	0.500	"
1,2,4-Trimethylbenzene	ND	0.500	"
1,2-Dibromo-3-chloropropane	ND	0.500	"
1,2-Dibromoethane	ND	0.500	"
1,2-Dichlorobenzene	ND	0.500	"
1,2-Dichloroethane	ND	0.500	"
1,2-Dichloropropane	ND	0.500	"
1,3,5-Trimethylbenzene	ND	0.500	"
1,3-Dichlorobenzene	ND	0.500	"
1,4-Dichlorobenzene	ND	0.500	"
2-Butanone	ND	0.500	"
2-Hexanone	ND	0.500	"
4-Methyl-2-pentanone	ND	0.500	"
Acetone	ND	2.00	"
Acrolein	ND	0.500	"
Acrylonitrile	ND	0.500	"
Benzene	ND	0.500	"
Bromochloromethane	ND	0.500	"
Bromodichloromethane	ND	0.500	"
Bromoform	ND	0.500	"
Bromomethane	ND	2.00	"
Carbon disulfide	ND	0.500	"
Carbon tetrachloride	ND	0.500	"
Chlorobenzene	ND	0.500	"
Chloroethane	ND	0.500	"
Chloroform	ND	0.500	"
Chloromethane	ND	0.500	"
cis-1,2-Dichloroethylene	ND	0.500	"
cis-1,3-Dichloropropylene	ND	0.500	"
Cyclohexane	ND	0.500	"
Dibromochloromethane	ND	0.500	"
Dibromomethane	ND	0.500	"
Dichlorodifluoromethane	ND	0.500	"
Ethyl Benzene	ND	0.500	"
Hexachlorobutadiene	ND	0.500	"
Isopropylbenzene	ND	0.500	"
Methyl acetate	ND	0.500	"
Methyl tert-butyl ether (MTBE)	ND	0.500	"
Methylcyclohexane	ND	0.500	"
Methylene chloride	ND	2.00	"

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60510 - EPA 5030B											
Blank (BB60510-BLK1) Blank								Prepared & Analyzed: 02/10/2026			
n-Butylbenzene	ND	0.500	ug/L								
n-Propylbenzene	ND	0.500	"								
o-Xylene	ND	0.500	"								
p- & m- Xylenes	ND	1.00	"								
p-Isopropyltoluene	ND	0.500	"								
sec-Butylbenzene	ND	0.500	"								
Styrene	ND	0.500	"								
tert-Butyl alcohol (TBA)	ND	1.00	"								
tert-Butylbenzene	ND	0.500	"								
Tetrachloroethylene	ND	0.500	"								
Toluene	ND	0.500	"								
trans-1,2-Dichloroethylene	ND	0.500	"								
trans-1,3-Dichloropropylene	ND	0.500	"								
Trichloroethylene	ND	0.500	"								
Trichlorofluoromethane	ND	0.500	"								
Vinyl Chloride	ND	0.500	"								
Xylenes, Total	ND	1.50	"								
Surrogate: SURR: 1,2-Dichloroethane-d4	*10.2*		*"*	*10.0*		*102*	*69-130*				
Surrogate: SURR: Toluene-d8	*9.81*		*"*	*10.0*		*98.1*	*81-117*				
Surrogate: SURR: p-Bromofluorobenzene	*10.1*		*"*	*10.0*		*101*	*79-122*				
LCS (BB60510-BS1) LCS								Prepared & Analyzed: 02/10/2026			
1,1,1,2-Tetrachloroethane	10.5		ug/L	10.0		105	82-126				
1,1,1-Trichloroethane	11.3		"	10.0		113	78-136				
1,1,2,2-Tetrachloroethane	11.0		"	10.0		110	76-129				
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	11.4	0.500	"				54-165				
1,1,2-Trichloroethane	10.2		"	10.0		102	82-123				
1,1-Dichloroethane	10.9		"	10.0		109	82-129				
1,1-Dichloroethylene	10.9		"	10.0		109	68-138				
1,2,3-Trichlorobenzene	8.33		"	10.0		83.3	76-136				
1,2,3-Trichloropropane	10.5		"	10.0		105	77-128				
1,2,4-Trichlorobenzene	9.11		"	10.0		91.1	76-137				
1,2,4-Trimethylbenzene	10.5		"	10.0		105	82-132				
1,2-Dibromo-3-chloropropane	10.9		"	10.0		109	45-147				
1,2-Dibromoethane	10.4		"	10.0		104	83-124				
1,2-Dichlorobenzene	9.94		"	10.0		99.4	79-123				
1,2-Dichloroethane	10.3		"	10.0		103	73-132				
1,2-Dichloropropane	9.46		"	10.0		94.6	78-126				
1,3,5-Trimethylbenzene	10.8		"	10.0		108	80-131				
1,3-Dichlorobenzene	10.2		"	10.0		102	86-122				
1,4-Dichlorobenzene	10.2		"	10.0		102	85-124				
2-Butanone	10.2		"	20.0		50.8	49-152				
2-Hexanone	9.25		"	20.0		46.2	51-146	Low Bias			
4-Methyl-2-pentanone	9.84		"	20.0		49.2	57-145	Low Bias			
Acetone	7.53		"	20.0		37.6	14-150				
Acrolein	34.7		"	40.0		86.7	10-153				
Acrylonitrile	11.7		"	10.0		117	51-150				
Benzene	11.0		"	10.0		110	85-126				
Bromochloromethane	10.7		"	10.0		107	77-128				
Bromodichloromethane	9.99		"	10.0		99.9	79-128				

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60510 - EPA 5030B											
LCS (BB60510-BS1) LCS							Prepared & Analyzed: 02/10/2026				
Bromoform	10.4		ug/L	10.0		104	78-133				
Bromomethane	6.01		"	10.0		60.1	43-168				
Carbon disulfide	10.6		"	10.0		106	68-146				
Carbon tetrachloride	11.7		"	10.0		117	77-141				
Chlorobenzene	10.3		"	10.0		103	88-120				
Chloroethane	12.8		"	10.0		128	65-136				
Chloroform	10.6		"	10.0		106	82-128				
Chloromethane	8.84		"	10.0		88.4	43-155				
cis-1,2-Dichloroethylene	11.0		"	10.0		110	83-129				
cis-1,3-Dichloropropylene	10.3		"	10.0		103	80-131				
Cyclohexane	10.8		"	10.0		108	63-149				
Dibromochloromethane	10.5		"	10.0		105	80-130				
Dibromomethane	10.4		"	10.0		104	72-134				
Dichlorodifluoromethane	9.50		"	10.0		95.0	44-144				
Ethyl Benzene	10.4		"	10.0		104	80-131				
Hexachlorobutadiene	9.70		"	10.0		97.0	67-146				
Isopropylbenzene	11.3		"	10.0		113	76-140				
Methyl acetate	9.98		"	10.0		99.8	51-139				
Methyl tert-butyl ether (MTBE)	9.84		"	20.0		49.2	76-135	Low Bias			
Methylcyclohexane	10.4		"	10.0		104	72-143				
Methylene chloride	9.89		"	10.0		98.9	55-137				
n-Butylbenzene	10.1		"	10.0		101	79-132				
n-Propylbenzene	10.7		"	10.0		107	78-133				
o-Xylene	10.3		"	10.0		103	78-130				
p- & m- Xylenes	20.6		"	20.0		103	77-133				
p-Isopropyltoluene	10.7		"	10.0		107	81-136				
sec-Butylbenzene	10.6		"	10.0		106	79-137				
Styrene	10.2		"	10.0		102	67-132				
tert-Butyl alcohol (TBA)	51.3		"	50.0		103	25-162				
tert-Butylbenzene	10.5		"	10.0		105	77-138				
Tetrachloroethylene	6.02		"	10.0		60.2	82-131	Low Bias			
Toluene	10.4		"	10.0		104	80-127				
trans-1,2-Dichloroethylene	11.1		"	10.0		111	80-132				
trans-1,3-Dichloropropylene	10.2		"	10.0		102	78-131				
Trichloroethylene	9.94		"	10.0		99.4	82-128				
Trichlorofluoromethane	11.1		"	10.0		111	67-139				
Vinyl Chloride	11.0		"	10.0		110	58-145				
Surrogate: SURR: 1,2-Dichloroethane-d4	*9.94*		*"*	*10.0*		*99.4*	*69-130*				
Surrogate: SURR: Toluene-d8	*9.73*		*"*	*10.0*		*97.3*	*81-117*				
Surrogate: SURR: p-Bromofluorobenzene	*10.2*		*"*	*10.0*		*102*	*79-122*				

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60510 - EPA 5030B											
LCS Dup (BB60510-BSD1) LCS Dup							Prepared & Analyzed: 02/10/2026				
1,1,1,2-Tetrachloroethane	10.5		ug/L	10.0		105	82-126		0.477	30	
1,1,1-Trichloroethane	10.8		"	10.0		108	78-136		4.79	30	
1,1,2,2-Tetrachloroethane	10.6		"	10.0		106	76-129		3.42	30	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	10.6	0.500	"				54-165		7.00	30	
1,1,2-Trichloroethane	9.95		"	10.0		99.5	82-123		2.58	30	
1,1-Dichloroethane	10.3		"	10.0		103	82-129		4.91	30	
1,1-Dichloroethylene	10.3		"	10.0		103	68-138		5.56	30	
1,2,3-Trichlorobenzene	8.94		"	10.0		89.4	76-136		7.06	30	
1,2,3-Trichloropropane	10.2		"	10.0		102	77-128		2.32	30	
1,2,4-Trichlorobenzene	9.09		"	10.0		90.9	76-137		0.220	30	
1,2,4-Trimethylbenzene	9.86		"	10.0		98.6	82-132		6.29	30	
1,2-Dibromo-3-chloropropane	10.7		"	10.0		107	45-147		1.30	30	
1,2-Dibromoethane	10.2		"	10.0		102	83-124		2.43	30	
1,2-Dichlorobenzene	9.62		"	10.0		96.2	79-123		3.27	30	
1,2-Dichloroethane	9.99		"	10.0		99.9	73-132		3.35	30	
1,2-Dichloropropane	9.08		"	10.0		90.8	78-126		4.10	30	
1,3,5-Trimethylbenzene	10.3		"	10.0		103	80-131		5.02	30	
1,3-Dichlorobenzene	9.67		"	10.0		96.7	86-122		5.43	30	
1,4-Dichlorobenzene	9.53		"	10.0		95.3	85-124		6.79	30	
2-Butanone	9.59		"	20.0		48.0	49-152	Low Bias	5.77	30	
2-Hexanone	9.37		"	20.0		46.8	51-146	Low Bias	1.29	30	
4-Methyl-2-pentanone	10.0		"	20.0		50.2	57-145	Low Bias	1.91	30	
Acetone	8.54		"	20.0		42.7	14-150		12.6	30	
Acrolein	34.4		"	40.0		86.1	10-153		0.694	30	
Acrylonitrile	11.4		"	10.0		114	51-150		2.95	30	
Benzene	10.4		"	10.0		104	85-126		5.14	30	
Bromochloromethane	10.4		"	10.0		104	77-128		3.14	30	
Bromodichloromethane	9.79		"	10.0		97.9	79-128		2.02	30	
Bromoform	10.3		"	10.0		103	78-133		0.962	30	
Bromomethane	5.81		"	10.0		58.1	43-168		3.38	30	
Carbon disulfide	9.85		"	10.0		98.5	68-146		6.86	30	
Carbon tetrachloride	11.0		"	10.0		110	77-141		6.34	30	
Chlorobenzene	9.98		"	10.0		99.8	88-120		2.77	30	
Chloroethane	12.2		"	10.0		122	65-136		4.56	30	
Chloroform	10.2		"	10.0		102	82-128		3.75	30	
Chloromethane	8.71		"	10.0		87.1	43-155		1.48	30	
cis-1,2-Dichloroethylene	10.3		"	10.0		103	83-129		6.57	30	
cis-1,3-Dichloropropylene	9.94		"	10.0		99.4	80-131		3.56	30	
Cyclohexane	10.1		"	10.0		101	63-149		6.59	30	
Dibromochloromethane	10.4		"	10.0		104	80-130		1.63	30	
Dibromomethane	10.1		"	10.0		101	72-134		2.64	30	
Dichlorodifluoromethane	8.71		"	10.0		87.1	44-144		8.68	30	
Ethyl Benzene	10.0		"	10.0		100	80-131		3.44	30	
Hexachlorobutadiene	8.84		"	10.0		88.4	67-146		9.28	30	
Isopropylbenzene	10.7		"	10.0		107	76-140		5.47	30	
Methyl acetate	9.69		"	10.0		96.9	51-139		2.95	30	
Methyl tert-butyl ether (MTBE)	9.68		"	20.0		48.4	76-135	Low Bias	1.64	30	
Methylcyclohexane	10.2		"	10.0		102	72-143		1.94	30	
Methylene chloride	9.56		"	10.0		95.6	55-137		3.39	30	
n-Butylbenzene	9.99		"	10.0		99.9	79-132		1.29	30	

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Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60510 - EPA 5030B											
LCS Dup (BB60510-BSD1) LCS Dup									Prepared & Analyzed: 02/10/2026		
n-Propylbenzene	10.3		ug/L	10.0		103	78-133		3.80	30	
o-Xylene	10.1		"	10.0		101	78-130		2.15	30	
p- & m- Xylenes	20.5		"	20.0		102	77-133		0.681	30	
p-Isopropyltoluene	10.5		"	10.0		105	81-136		2.27	30	
sec-Butylbenzene	10.3		"	10.0		103	79-137		2.88	30	
Styrene	9.84		"	10.0		98.4	67-132		3.49	30	
tert-Butyl alcohol (TBA)	49.6		"	50.0		99.3	25-162		3.39	30	
tert-Butylbenzene	10.3		"	10.0		103	77-138		1.82	30	
Tetrachloroethylene	5.72		"	10.0		57.2	82-131	Low Bias	5.11	30	
Toluene	10.1		"	10.0		101	80-127		3.32	30	
trans-1,2-Dichloroethylene	10.6		"	10.0		106	80-132		4.70	30	
trans-1,3-Dichloropropylene	10.2		"	10.0		102	78-131		0.393	30	
Trichloroethylene	9.38		"	10.0		93.8	82-128		5.80	30	
Trichlorofluoromethane	10.4		"	10.0		104	67-139		6.33	30	
Vinyl Chloride	10.2		"	10.0		102	58-145		6.88	30	
Surrogate: SURR: 1,2-Dichloroethane-d4	*10.2*		*"*	*10.0*		*102*	*69-130*				
Surrogate: SURR: Toluene-d8	*9.86*		*"*	*10.0*		*98.6*	*81-117*				
Surrogate: SURR: p-Bromofluorobenzene	*10.1*		*"*	*10.0*		*101*	*79-122*				
Batch BB60604 - EPA 5030B											
Blank (BB60604-BLK1) Blank									Prepared & Analyzed: 02/11/2026		
1,1,1,2-Tetrachloroethane	ND	0.500	ug/L								
1,1,1-Trichloroethane	ND	0.500	"								
1,1,2,2-Tetrachloroethane	ND	0.500	"								
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.500	"								
1,1,2-Trichloroethane	ND	0.500	"								
1,1-Dichloroethane	ND	0.500	"								
1,1-Dichloroethylene	ND	0.500	"								
1,2,3-Trichlorobenzene	ND	0.500	"								
1,2,3-Trichloropropane	ND	0.500	"								
1,2,4-Trichlorobenzene	ND	0.500	"								
1,2,4-Trimethylbenzene	ND	0.500	"								
1,2-Dibromo-3-chloropropane	ND	0.500	"								
1,2-Dibromoethane	ND	0.500	"								
1,2-Dichlorobenzene	ND	0.500	"								
1,2-Dichloroethane	ND	0.500	"								
1,2-Dichloropropane	ND	0.500	"								
1,3,5-Trimethylbenzene	ND	0.500	"								
1,3-Dichlorobenzene	ND	0.500	"								
1,4-Dichlorobenzene	ND	0.500	"								
2-Butanone	ND	0.500	"								
2-Hexanone	ND	0.500	"								
4-Methyl-2-pentanone	ND	0.500	"								
Acetone	1.79	2.00	"								
Acrolein	ND	0.500	"								
Acrylonitrile	ND	0.500	"								
Benzene	ND	0.500	"								
Bromochloromethane	ND	0.500	"								
Bromodichloromethane	ND	0.500	"								
Bromoform	ND	0.500	"								

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Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60604 - EPA 5030B											
Blank (BB60604-BLK1) Blank								Prepared & Analyzed: 02/11/2026			
Bromomethane	ND	2.00	ug/L								
Carbon disulfide	ND	0.500	"								
Carbon tetrachloride	ND	0.500	"								
Chlorobenzene	ND	0.500	"								
Chloroethane	ND	0.500	"								
Chloroform	ND	0.500	"								
Chloromethane	ND	0.500	"								
cis-1,2-Dichloroethylene	ND	0.500	"								
cis-1,3-Dichloropropylene	ND	0.500	"								
Cyclohexane	ND	0.500	"								
Dibromochloromethane	ND	0.500	"								
Dibromomethane	ND	0.500	"								
Dichlorodifluoromethane	ND	0.500	"								
Ethyl Benzene	ND	0.500	"								
Hexachlorobutadiene	ND	0.500	"								
Isopropylbenzene	ND	0.500	"								
Methyl acetate	ND	0.500	"								
Methyl tert-butyl ether (MTBE)	ND	0.500	"								
Methylcyclohexane	ND	0.500	"								
Methylene chloride	ND	2.00	"								
n-Butylbenzene	ND	0.500	"								
n-Propylbenzene	ND	0.500	"								
o-Xylene	ND	0.500	"								
p- & m- Xylenes	ND	1.00	"								
p-Isopropyltoluene	ND	0.500	"								
sec-Butylbenzene	ND	0.500	"								
Styrene	ND	0.500	"								
tert-Butyl alcohol (TBA)	ND	1.00	"								
tert-Butylbenzene	ND	0.500	"								
Tetrachloroethylene	ND	0.500	"								
Toluene	ND	0.500	"								
trans-1,2-Dichloroethylene	ND	0.500	"								
trans-1,3-Dichloropropylene	ND	0.500	"								
Trichloroethylene	ND	0.500	"								
Trichlorofluoromethane	ND	0.500	"								
Vinyl Chloride	ND	0.500	"								
Xylenes, Total	ND	1.50	"								
Surrogate: SURR: 1,2-Dichloroethane-d4	*10.8*		*"*	*10.0*		*108*	*69-130*				
Surrogate: SURR: Toluene-d8	*10.9*		*"*	*10.0*		*109*	*81-117*				
Surrogate: SURR: p-Bromofluorobenzene	*10.8*		*"*	*10.0*		*108*	*79-122*				

Volatile Organic Compounds by GC/MS - Quality Control Data

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Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60604 - EPA 5030B											
LCS (BB60604-BS1) LCS							Prepared & Analyzed: 02/11/2026				
1,1,1,2-Tetrachloroethane	10.4		ug/L	10.0		104	82-126				
1,1,1-Trichloroethane	11.0		"	10.0		110	78-136				
1,1,2,2-Tetrachloroethane	8.80		"	10.0		88.0	76-129				
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	11.1	0.500	"				54-165				
1,1,2-Trichloroethane	10.0		"	10.0		100	82-123				
1,1-Dichloroethane	10.6		"	10.0		106	82-129				
1,1-Dichloroethylene	10.3		"	10.0		103	68-138				
1,2,3-Trichlorobenzene	9.06		"	10.0		90.6	76-136				
1,2,3-Trichloropropane	8.81		"	10.0		88.1	77-128				
1,2,4-Trichlorobenzene	9.45		"	10.0		94.5	76-137				
1,2,4-Trimethylbenzene	10.6		"	10.0		106	82-132				
1,2-Dibromo-3-chloropropane	8.50		"	10.0		85.0	45-147				
1,2-Dibromoethane	10.3		"	10.0		103	83-124				
1,2-Dichlorobenzene	9.45		"	10.0		94.5	79-123				
1,2-Dichloroethane	10.2		"	10.0		102	73-132				
1,2-Dichloropropane	10.3		"	10.0		103	78-126				
1,3,5-Trimethylbenzene	10.7		"	10.0		107	80-131				
1,3-Dichlorobenzene	9.86		"	10.0		98.6	86-122				
1,4-Dichlorobenzene	9.92		"	10.0		99.2	85-124				
2-Butanone	50.0		"	20.0		250	49-152	High Bias			
2-Hexanone	41.0		"	20.0		205	51-146	High Bias			
4-Methyl-2-pentanone	42.4		"	20.0		212	57-145	High Bias			
Acetone	37.6		"	20.0		188	14-150	High Bias			
Acrolein	26.0		"	40.0		65.0	10-153				
Acrylonitrile	10.8		"	10.0		108	51-150				
Benzene	10.7		"	10.0		107	85-126				
Bromochloromethane	9.78		"	10.0		97.8	77-128				
Bromodichloromethane	10.3		"	10.0		103	79-128				
Bromoform	9.06		"	10.0		90.6	78-133				
Bromomethane	8.97		"	10.0		89.7	43-168				
Carbon disulfide	9.73		"	10.0		97.3	68-146				
Carbon tetrachloride	10.4		"	10.0		104	77-141				
Chlorobenzene	10.6		"	10.0		106	88-120				
Chloroethane	13.8		"	10.0		138	65-136	High Bias			
Chloroform	10.5		"	10.0		105	82-128				
Chloromethane	7.58		"	10.0		75.8	43-155				
cis-1,2-Dichloroethylene	10.6		"	10.0		106	83-129				
cis-1,3-Dichloropropylene	10.5		"	10.0		105	80-131				
Cyclohexane	10.7		"	10.0		107	63-149				
Dibromochloromethane	9.93		"	10.0		99.3	80-130				
Dibromomethane	10.3		"	10.0		103	72-134				
Dichlorodifluoromethane	4.34		"	10.0		43.4	44-144	Low Bias			
Ethyl Benzene	11.5		"	10.0		115	80-131				
Hexachlorobutadiene	10.7		"	10.0		107	67-146				
Isopropylbenzene	11.1		"	10.0		111	76-140				
Methyl acetate	9.97		"	10.0		99.7	51-139				
Methyl tert-butyl ether (MTBE)	10.2		"	20.0		50.8	76-135	Low Bias			
Methylcyclohexane	10.5		"	10.0		105	72-143				
Methylene chloride	7.52		"	10.0		75.2	55-137				
n-Butylbenzene	9.14		"	10.0		91.4	79-132				

Volatile Organic Compounds by GC/MS - Quality Control Data

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Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60604 - EPA 5030B											
LCS (BB60604-BS1) LCS							Prepared & Analyzed: 02/11/2026				
n-Propylbenzene	10.8		ug/L	10.0		108	78-133				
o-Xylene	11.6		"	10.0		116	78-130				
p- & m- Xylenes	22.5		"	20.0		113	77-133				
p-Isopropyltoluene	11.5		"	10.0		115	81-136				
sec-Butylbenzene	11.0		"	10.0		110	79-137				
Styrene	11.5		"	10.0		115	67-132				
tert-Butyl alcohol (TBA)	52.7		"	50.0		105	25-162				
tert-Butylbenzene	9.48		"	10.0		94.8	77-138				
Tetrachloroethylene	9.90		"	10.0		99.0	82-131				
Toluene	11.1		"	10.0		111	80-127				
trans-1,2-Dichloroethylene	11.1		"	10.0		111	80-132				
trans-1,3-Dichloropropylene	10.5		"	10.0		105	78-131				
Trichloroethylene	10.7		"	10.0		107	82-128				
Trichlorofluoromethane	11.0		"	10.0		110	67-139				
Vinyl Chloride	8.73		"	10.0		87.3	58-145				
Surrogate: SURR: 1,2-Dichloroethane-d4	*9.99*		*"*	*10.0*		*99.9*	*69-130*				
Surrogate: SURR: Toluene-d8	*11.0*		*"*	*10.0*		*110*	*81-117*				
Surrogate: SURR: p-Bromofluorobenzene	*10.8*		*"*	*10.0*		*108*	*79-122*				
LCS Dup (BB60604-BSD1) LCS Dup							Prepared & Analyzed: 02/11/2026				
1,1,1,2-Tetrachloroethane	9.86		ug/L	10.0		98.6	82-126		5.43	30	
1,1,1-Trichloroethane	10.1		"	10.0		101	78-136		8.23	30	
1,1,2,2-Tetrachloroethane	8.87		"	10.0		88.7	76-129		0.792	30	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	10.1	0.500	"				54-165		9.36	30	
1,1,2-Trichloroethane	10.0		"	10.0		100	82-123		0.200	30	
1,1-Dichloroethane	9.95		"	10.0		99.5	82-129		6.80	30	
1,1-Dichloroethylene	9.46		"	10.0		94.6	68-138		8.60	30	
1,2,3-Trichlorobenzene	8.82		"	10.0		88.2	76-136		2.68	30	
1,2,3-Trichloropropane	8.79		"	10.0		87.9	77-128		0.227	30	
1,2,4-Trichlorobenzene	8.92		"	10.0		89.2	76-137		5.77	30	
1,2,4-Trimethylbenzene	9.50		"	10.0		95.0	82-132		11.2	30	
1,2-Dibromo-3-chloropropane	8.50		"	10.0		85.0	45-147		0.00	30	
1,2-Dibromoethane	10.2		"	10.0		102	83-124		0.876	30	
1,2-Dichlorobenzene	8.91		"	10.0		89.1	79-123		5.88	30	
1,2-Dichloroethane	10.1		"	10.0		101	73-132		1.28	30	
1,2-Dichloropropane	9.71		"	10.0		97.1	78-126		5.51	30	
1,3,5-Trimethylbenzene	9.44		"	10.0		94.4	80-131		12.1	30	
1,3-Dichlorobenzene	9.01		"	10.0		90.1	86-122		9.01	30	
1,4-Dichlorobenzene	9.10		"	10.0		91.0	85-124		8.62	30	
2-Butanone	47.9		"	20.0		240	49-152	High Bias	4.13	30	
2-Hexanone	44.1		"	20.0		220	51-146	High Bias	7.17	30	
4-Methyl-2-pentanone	45.0		"	20.0		225	57-145	High Bias	5.86	30	
Acetone	40.9		"	20.0		205	14-150	High Bias	8.32	30	
Acrolein	26.6		"	40.0		66.6	10-153		2.39	30	
Acrylonitrile	10.3		"	10.0		103	51-150		4.73	30	
Benzene	9.93		"	10.0		99.3	85-126		7.09	30	
Bromochloromethane	9.75		"	10.0		97.5	77-128		0.307	30	
Bromodichloromethane	9.84		"	10.0		98.4	79-128		4.18	30	
Bromoform	9.23		"	10.0		92.3	78-133		1.86	30	
Bromomethane	8.48		"	10.0		84.8	43-168		5.62	30	

Volatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60604 - EPA 5030B											
LCS Dup (BB60604-BSD1) LCS Dup								Prepared & Analyzed: 02/11/2026			
Carbon disulfide	8.95		ug/L	10.0		89.5	68-146		8.35	30	
Carbon tetrachloride	9.69		"	10.0		96.9	77-141		6.78	30	
Chlorobenzene	9.86		"	10.0		98.6	88-120		7.42	30	
Chloroethane	12.9		"	10.0		129	65-136		6.52	30	
Chloroform	10.0		"	10.0		100	82-128		4.39	30	
Chloromethane	6.94		"	10.0		69.4	43-155		8.82	30	
cis-1,2-Dichloroethylene	10.1		"	10.0		101	83-129		4.93	30	
cis-1,3-Dichloropropylene	10.1		"	10.0		101	80-131		4.47	30	
Cyclohexane	9.77		"	10.0		97.7	63-149		8.81	30	
Dibromochloromethane	9.74		"	10.0		97.4	80-130		1.93	30	
Dibromomethane	10.1		"	10.0		101	72-134		1.86	30	
Dichlorodifluoromethane	3.99		"	10.0		39.9	44-144	Low Bias	8.40	30	
Ethyl Benzene	10.4		"	10.0		104	80-131		9.79	30	
Hexachlorobutadiene	9.34		"	10.0		93.4	67-146		13.5	30	
Isopropylbenzene	9.65		"	10.0		96.5	76-140		14.1	30	
Methyl acetate	11.1		"	10.0		111	51-139		10.8	30	
Methyl tert-butyl ether (MTBE)	10.7		"	20.0		53.5	76-135	Low Bias	5.28	30	
Methylcyclohexane	9.33		"	10.0		93.3	72-143		11.7	30	
Methylene chloride	7.26		"	10.0		72.6	55-137		3.52	30	
n-Butylbenzene	7.93		"	10.0		79.3	79-132		14.2	30	
n-Propylbenzene	9.39		"	10.0		93.9	78-133		13.5	30	
o-Xylene	10.8		"	10.0		108	78-130		7.24	30	
p- & m- Xylenes	20.5		"	20.0		102	77-133		9.53	30	
p-Isopropyltoluene	10.1		"	10.0		101	81-136		13.1	30	
sec-Butylbenzene	9.62		"	10.0		96.2	79-137		13.6	30	
Styrene	10.9		"	10.0		109	67-132		5.37	30	
tert-Butyl alcohol (TBA)	52.4		"	50.0		105	25-162		0.590	30	
tert-Butylbenzene	8.34		"	10.0		83.4	77-138		12.8	30	
Tetrachloroethylene	8.96		"	10.0		89.6	82-131		9.97	30	
Toluene	10.1		"	10.0		101	80-127		9.17	30	
trans-1,2-Dichloroethylene	10.2		"	10.0		102	80-132		8.54	30	
trans-1,3-Dichloropropylene	10.1		"	10.0		101	78-131		4.47	30	
Trichloroethylene	9.73		"	10.0		97.3	82-128		9.50	30	
Trichlorofluoromethane	10.2		"	10.0		102	67-139		7.80	30	
Vinyl Chloride	8.14		"	10.0		81.4	58-145		6.99	30	
Surrogate: SURR: 1,2-Dichloroethane-d4	*10.6*		*"*	*10.0*		*106*	*69-130*				
Surrogate: SURR: Toluene-d8	*10.8*		*"*	*10.0*		*108*	*81-117*				
Surrogate: SURR: p-Bromofluorobenzene	*10.5*		*"*	*10.0*		*105*	*79-122*				

Semivolatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BB60001 - EPA 3510C

Blank (BB60001-BLK1) Blank — Prepared: 02/01/2026 Analyzed: 02/03/2026

1,1-Biphenyl	ND	5.00	ug/L
1,2,4,5-Tetrachlorobenzene	ND	5.00	"
1,2-Diphenylhydrazine (as Azobenzene)	ND	5.00	"
2,3,4,6-Tetrachlorophenol	ND	5.00	"
2,4,5-Trichlorophenol	ND	5.00	"
2,4,6-Trichlorophenol	ND	5.00	"
2,4-Dichlorophenol	ND	5.00	"
2,4-Dimethylphenol	ND	5.00	"
2,4-Dinitrophenol	ND	5.00	"
2,4-Dinitrotoluene	ND	5.00	"
2,6-Dinitrotoluene	ND	5.00	"
2-Chloronaphthalene	ND	5.00	"
2-Chlorophenol	ND	5.00	"
2-Methylnaphthalene	ND	5.00	"
2-Methylphenol	ND	5.00	"
2-Nitroaniline	ND	5.00	"
2-Nitrophenol	ND	5.00	"
3- & 4-Methylphenols	ND	5.00	"
3,3-Dichlorobenzidine	ND	5.00	"
3-Nitroaniline	ND	5.00	"
4,6-Dinitro-2-methylphenol	ND	5.00	"
4-Bromophenyl phenyl ether	ND	5.00	"
4-Chloro-3-methylphenol	ND	5.00	"
4-Chloroaniline	ND	5.00	"
4-Chlorophenyl phenyl ether	ND	5.00	"
4-Nitroaniline	ND	5.00	"
4-Nitrophenol	ND	5.00	"
Acetophenone	ND	5.00	"
Aniline	ND	5.00	"
Benzaldehyde	ND	5.00	"
Benzidine	ND	5.00	"
Benzoic acid	ND	5.00	"
Benzyl alcohol	ND	5.00	"
Benzyl butyl phthalate	ND	5.00	"
Bis(2-chloroethoxy)methane	ND	5.00	"
Bis(2-chloroethyl)ether	ND	5.00	"
Bis(2-chloroisopropyl)ether	ND	5.00	"
Caprolactam	ND	5.00	"
Carbazole	ND	5.00	"
Dibenzofuran	ND	5.00	"
Diethyl phthalate	ND	5.00	"
Dimethyl phthalate	ND	5.00	"
Di-n-butyl phthalate	ND	5.00	"
Di-n-octyl phthalate	ND	5.00	"
Diphenylamine	ND	5.00	"
Hexachlorocyclopentadiene	ND	10.0	"
Isophorone	ND	5.00	"
N-nitroso-di-n-propylamine	ND	5.00	"
N-Nitrosodiphenylamine	ND	5.00	"
Phenol	ND	5.00	"

Semivolatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60001 - EPA 3510C											
Blank (BB60001-BLK1) Blank								Prepared: 02/01/2026 Analyzed: 02/03/2026			
Pyridine	ND	5.00	ug/L								
Surrogate: SURR: 2-Fluorophenol	*12.1*		*"*	*50.0*		*24.3*	*19.7-63.1*				
Surrogate: SURR: Phenol-d6	*7.24*		*"*	*50.0*		*14.5*	*10.1-41.7*				
Surrogate: SURR: Nitrobenzene-d5	*11.7*		*"*	*25.0*		*46.8*	*50.2-113*				
Surrogate: SURR: 2-Fluorobiphenyl	*12.0*		*"*	*25.0*		*48.2*	*39.9-105*				
Surrogate: SURR: 2,4,6-Tribromophenol	*24.7*		*"*	*50.0*		*49.5*	*39.3-151*				
Surrogate: SURR: Terphenyl-d14	*15.4*		*"*	*25.0*		*61.5*	*30.7-106*				
LCS (BB60001-BS1) LCS								Prepared: 02/01/2026 Analyzed: 02/03/2026			
1,1-Biphenyl	11.1	5.00	ug/L	25.0		44.4	33-95				
1,2,4,5-Tetrachlorobenzene	11.2	5.00	"	25.0		44.8	26-120				
1,2-Diphenylhydrazine (as Azobenzene)	10.8	5.00	"	25.0		43.3	16-141				
2,3,4,6-Tetrachlorophenol	12.8	5.00	"	25.0		51.2	30-130				
2,4,5-Trichlorophenol	12.8	5.00	"	25.0		51.4	32-114				
2,4,6-Trichlorophenol	11.5	5.00	"	25.0		46.1	35-118				
2,4-Dichlorophenol	11.3	5.00	"	25.0		45.3	25-116				
2,4-Dimethylphenol	9.57	5.00	"	25.0		38.3	15-116				
2,4-Dinitrophenol	14.8	5.00	"	25.0		59.0	10-170				
2,4-Dinitrotoluene	12.8	5.00	"	25.0		51.2	41-128				
2,6-Dinitrotoluene	12.4	5.00	"	25.0		49.7	45-116				
2-Chloronaphthalene	10.9	5.00	"	25.0		43.5	33-112				
2-Chlorophenol	9.87	5.00	"	25.0		39.5	15-120				
2-Methylnaphthalene	9.97	5.00	"	25.0		39.9	24-118				
2-Methylphenol	8.54	5.00	"	25.0		34.2	10-110				
2-Nitroaniline	12.5	5.00	"	25.0		50.2	34-129				
2-Nitrophenol	10.8	5.00	"	25.0		43.4	28-118				
3- & 4-Methylphenols	6.95	5.00	"	25.0		27.8	10-107				
3,3-Dichlorobenzidine	8.82	5.00	"	25.0		35.3	15-187				
3-Nitroaniline	9.10	5.00	"	25.0		36.4	24-134				
4,6-Dinitro-2-methylphenol	14.5	5.00	"	25.0		58.1	10-153				
4-Bromophenyl phenyl ether	11.5	5.00	"	25.0		46.0	34-120				
4-Chloro-3-methylphenol	11.8	5.00	"	25.0		47.2	20-120				
4-Chloroaniline	6.76	5.00	"	25.0		27.0	10-147				
4-Chlorophenyl phenyl ether	11.6	5.00	"	25.0		46.3	27-121				
4-Nitroaniline	11.4	5.00	"	25.0		45.8	13-134				
4-Nitrophenol	5.26	5.00	"	25.0		21.0	10-131				
Acetophenone	11.5	5.00	"	25.0		46.1	25-110				
Aniline	4.56	5.00	"	25.0		18.2	10-117				
Benzaldehyde	11.9	5.00	"	25.0		47.6	29-117				
Benzoic acid	ND	5.00	"	25.0			30-130	Low Bias			
Benzyl alcohol	7.03	5.00	"	25.0		28.1	10-117				
Benzyl butyl phthalate	12.9	5.00	"	25.0		51.6	29-133				
Bis(2-chloroethoxy)methane	11.1	5.00	"	25.0		44.4	10-154				
Bis(2-chloroethyl)ether	9.90	5.00	"	25.0		39.6	17-125				
Bis(2-chloroisopropyl)ether	9.84	5.00	"	25.0		39.4	10-139				
Caprolactam	11.7	5.00	"	25.0		46.7	10-137				
Carbazole	12.7	5.00	"	25.0		51.0	42-126				
Dibenzofuran	11.5	5.00	"	25.0		46.0	36-113				
Diethyl phthalate	12.2	5.00	"	25.0		48.6	38-115				
Dimethyl phthalate	12.2	5.00	"	25.0		48.6	38-129				

Semivolatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60001 - EPA 3510C											
LCS (BB60001-BS1) LCS									Prepared: 02/01/2026 Analyzed: 02/03/2026		
Di-n-butyl phthalate	12.8	5.00	ug/L	25.0		51.2	31-120				
Di-n-octyl phthalate	13.0	5.00	"	25.0		51.9	21-149				
Diphenylamine	13.4	5.00	"	25.0		53.4	40-140				
Hexachlorocyclopentadiene	9.91	10.0	"	25.0		39.6	10-130				
Isophorone	11.6	5.00	"	25.0		46.4	25-127				
N-nitroso-di-n-propylamine	10.6	5.00	"	25.0		42.2	26-122				
N-Nitrosodiphenylamine	13.1	5.00	"	25.0		52.3	23-149				
Phenol	3.67	5.00	"	25.0		14.7	10-110				
Pyridine	3.83	5.00	"	35.0		10.9	10-90				
Surrogate: SURR: 2-Fluorophenol	*10.9*		*"*	*50.0*		*21.8*	*19.7-63.1*				
Surrogate: SURR: Phenol-d6	*6.51*		*"*	*50.0*		*13.0*	*10.1-41.7*				
Surrogate: SURR: Nitrobenzene-d5	*9.90*		*"*	*25.0*		*39.6*	*50.2-113*				
Surrogate: SURR: 2-Fluorobiphenyl	*10.2*		*"*	*25.0*		*40.9*	*39.9-105*				
Surrogate: SURR: 2,4,6-Tribromophenol	*23.4*		*"*	*50.0*		*46.8*	*39.3-151*				
Surrogate: SURR: Terphenyl-d14	*12.4*		*"*	*25.0*		*49.7*	*30.7-106*				
LCS Dup (BB60001-BSD1) LCS Dup									Prepared: 02/01/2026 Analyzed: 02/03/2026		
1,1-Biphenyl	11.7	5.00	ug/L	25.0		46.8	33-95		5.35	20	
1,2,4,5-Tetrachlorobenzene	11.5	5.00	"	25.0		46.2	26-120		2.90	20	
1,2-Diphenylhydrazine (as Azobenzene)	12.1	5.00	"	25.0		48.3	16-141		10.8	20	
2,3,4,6-Tetrachlorophenol	13.2	5.00	"	25.0		52.8	30-130		3.23	20	
2,4,5-Trichlorophenol	13.0	5.00	"	25.0		52.2	32-114		1.47	20	
2,4,6-Trichlorophenol	12.0	5.00	"	25.0		48.0	35-118		4.08	20	
2,4-Dichlorophenol	12.1	5.00	"	25.0		48.2	25-116		6.24	20	
2,4-Dimethylphenol	10.3	5.00	"	25.0		41.2	15-116		7.25	20	
2,4-Dinitrophenol	15.9	5.00	"	25.0		63.6	10-170		7.37	20	
2,4-Dinitrotoluene	13.7	5.00	"	25.0		55.0	41-128		7.08	20	
2,6-Dinitrotoluene	13.4	5.00	"	25.0		53.6	45-116		7.59	20	
2-Chloronaphthalene	11.2	5.00	"	25.0		45.0	33-112		3.35	20	
2-Chlorophenol	10.6	5.00	"	25.0		42.3	15-120		6.85	20	
2-Methylnaphthalene	10.4	5.00	"	25.0		41.6	24-118		4.32	20	
2-Methylphenol	9.27	5.00	"	25.0		37.1	10-110		8.20	20	
2-Nitroaniline	13.2	5.00	"	25.0		52.9	34-129		5.28	20	
2-Nitrophenol	11.5	5.00	"	25.0		46.1	28-118		6.08	20	
3- & 4-Methylphenols	7.26	5.00	"	25.0		29.0	10-107		4.36	20	
3,3-Dichlorobenzidine	9.75	5.00	"	25.0		39.0	15-187		10.0	20	
3-Nitroaniline	9.37	5.00	"	25.0		37.5	24-134		2.92	20	
4,6-Dinitro-2-methylphenol	15.4	5.00	"	25.0		61.7	10-153		6.01	20	
4-Bromophenyl phenyl ether	12.1	5.00	"	25.0		48.5	34-120		5.25	20	
4-Chloro-3-methylphenol	12.5	5.00	"	25.0		50.0	20-120		5.93	20	
4-Chloroaniline	6.66	5.00	"	25.0		26.6	10-147		1.49	20	
4-Chlorophenyl phenyl ether	12.2	5.00	"	25.0		49.0	27-121		5.62	20	
4-Nitroaniline	12.3	5.00	"	25.0		49.1	13-134		6.91	20	
4-Nitrophenol	5.53	5.00	"	25.0		22.1	10-131		5.00	20	
Acetophenone	12.2	5.00	"	25.0		49.0	25-110		6.06	20	
Aniline	4.57	5.00	"	25.0		18.3	10-117		0.219	20	
Benzaldehyde	12.4	5.00	"	25.0		49.7	29-117		4.36	20	
Benzoic acid	ND	5.00	"	25.0			30-130	Low Bias		20	
Benzyl alcohol	7.50	5.00	"	25.0		30.0	10-117		6.47	20	
Benzyl butyl phthalate	14.1	5.00	"	25.0		56.6	29-133		9.17	20	

Semivolatile Organic Compounds by GC/MS - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60001 - EPA 3510C											
LCS Dup (BB60001-BSD1) LCS Dup								Prepared: 02/01/2026 Analyzed: 02/03/2026			
Bis(2-chloroethoxy)methane	11.8	5.00	ug/L	25.0		47.3	10-154		6.28	20	
Bis(2-chloroethyl)ether	10.6	5.00	"	25.0		42.4	17-125		6.83	20	
Bis(2-chloroisopropyl)ether	10.8	5.00	"	25.0		43.1	10-139		9.12	20	
Caprolactam	12.2	5.00	"	25.0		48.7	10-137		4.19	20	
Carbazole	13.4	5.00	"	25.0		53.8	42-126		5.42	20	
Dibenzofuran	12.1	5.00	"	25.0		48.5	36-113		5.25	20	
Diethyl phthalate	13.0	5.00	"	25.0		52.0	38-115		6.75	20	
Dimethyl phthalate	12.8	5.00	"	25.0		51.4	38-129		5.60	20	
Di-n-butyl phthalate	13.7	5.00	"	25.0		55.0	31-120		7.08	20	
Di-n-octyl phthalate	14.2	5.00	"	25.0		56.8	21-149		9.05	20	
Diphenylamine	14.2	5.00	"	25.0		56.8	40-140		6.10	20	
Hexachlorocyclopentadiene	10.1	10.0	"	25.0		40.4	10-130		1.90	20	
Isophorone	12.4	5.00	"	25.0		49.7	25-127		6.91	20	
N-nitroso-di-n-propylamine	11.3	5.00	"	25.0		45.2	26-122		6.78	20	
N-Nitrosodiphenylamine	14.1	5.00	"	25.0		56.4	23-149		7.43	20	
Phenol	3.92	5.00	"	25.0		15.7	10-110		6.59	20	
Pyridine	3.54	5.00	"	35.0		10.1	10-90		7.87	20	
Surrogate: SURR: 2-Fluorophenol	*12.0*		*"*	*50.0*		*23.9*	*19.7-63.1*				
Surrogate: SURR: Phenol-d6	*7.14*		*"*	*50.0*		*14.3*	*10.1-41.7*				
Surrogate: SURR: Nitrobenzene-d5	*10.6*		*"*	*25.0*		*42.3*	*50.2-113*				
Surrogate: SURR: 2-Fluorobiphenyl	*10.5*		*"*	*25.0*		*42.1*	*39.9-105*				
Surrogate: SURR: 2,4,6-Tribromophenol	*25.2*		*"*	*50.0*		*50.5*	*39.3-151*				
Surrogate: SURR: Terphenyl-d14	*13.9*		*"*	*25.0*		*55.6*	*30.7-106*				

Semivolatile Organic Compounds by GC/MS/SIM - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60002 - EPA 3510C											
Blank (BB60002-BLK2) Blank									Prepared: 02/01/2026 Analyzed: 02/03/2026		
Acenaphthene	ND	0.0500	ug/L								
Acenaphthylene	ND	0.0500	"								
Anthracene	ND	0.0500	"								
Atrazine	ND	0.500	"								
Benzo(a)anthracene	ND	0.0500	"								
Benzo(a)pyrene	ND	0.0500	"								
Benzo(b)fluoranthene	ND	0.0500	"								
Benzo(g,h,i)perylene	ND	0.0500	"								
Benzo(k)fluoranthene	ND	0.0500	"								
Bis(2-ethylhexyl)phthalate	ND	0.500	"								
Chrysene	ND	0.0500	"								
Dibenzo(a,h)anthracene	ND	0.0500	"								
Fluoranthene	ND	0.0500	"								
Fluorene	ND	0.0500	"								
Hexachlorobenzene	ND	0.0200	"								
Hexachlorobutadiene	ND	0.500	"								
Hexachloroethane	ND	0.500	"								
Indeno(1,2,3-cd)pyrene	ND	0.0500	"								
Naphthalene	ND	0.0500	"								
Nitrobenzene	ND	0.250	"								
N-Nitrosodimethylamine	ND	0.500	"								
Pentachlorophenol	ND	0.250	"								
Phenanthrene	ND	0.0500	"								
Pyrene	ND	0.0500	"								
LCS (BB60002-BS2) LCS									Prepared: 02/01/2026 Analyzed: 02/03/2026		
Acenaphthene	0.563	0.0500	ug/L	1.00		56.3	25-116				
Acenaphthylene	0.636	0.0500	"	1.00		63.6	26-116				
Anthracene	0.544	0.0500	"	1.00		54.4	25-123				
Benzo(a)anthracene	0.608	0.0500	"	1.00		60.8	33-125				
Benzo(a)pyrene	0.622	0.0500	"	1.00		62.2	32-132				
Benzo(b)fluoranthene	0.585	0.0500	"	1.00		58.5	22-137				
Benzo(g,h,i)perylene	0.822	0.0500	"	1.00		82.2	10-138				
Benzo(k)fluoranthene	0.786	0.0500	"	1.00		78.6	20-137				
Bis(2-ethylhexyl)phthalate	0.898	0.500	"	1.00		89.8	10-189				
Chrysene	0.826	0.0500	"	1.00		82.6	32-124				
Dibenzo(a,h)anthracene	0.868	0.0500	"	1.00		86.8	16-133				
Fluoranthene	0.659	0.0500	"	1.00		65.9	32-121				
Fluorene	0.600	0.0500	"	1.00		60.0	28-118				
Hexachlorobenzene	0.707	0.0200	"	1.00		70.7	23-124				
Hexachlorobutadiene	ND	0.500	"	1.00			15-123	Low Bias			
Hexachloroethane	2.57	0.500	"	1.00		257	18-115	High Bias			
Indeno(1,2,3-cd)pyrene	0.796	0.0500	"	1.00		79.6	15-135				
Naphthalene	0.656	0.0500	"	1.00		65.6	18-120				
Nitrobenzene	0.446	0.250	"	1.00		44.6	21-121				
N-Nitrosodimethylamine	ND	0.500	"	1.00			10-124	Low Bias			
Pentachlorophenol	ND	0.250	"	1.00			10-156	Low Bias			
Phenanthrene	0.627	0.0500	"	1.00		62.7	24-127				
Pyrene	0.688	0.0500	"	1.00		68.8	31-132				

Wet Chemistry Parameters - Quality Control Data

ALS Environmental - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB60099 - Analysis Preparation											
Blank (BB60099-BLK1) Blank								Prepared & Analyzed: 02/03/2026			
Total Organic Carbon (TOC)	ND	1.00	mg/L								
LCS (BB60099-BS1) LCS								Prepared & Analyzed: 02/03/2026			
Total Organic Carbon (TOC)	45.8	1.00	mg/L	50.0		91.7	79.5-125.1				
Duplicate (BB60099-DUP1) Duplicate *Source sample: 26A1333-01 (J-MW118_013026)								Prepared & Analyzed: 02/03/2026			
Total Organic Carbon (TOC)	61.2	1.00	mg/L		62.1				1.51	15	
Matrix Spike (BB60099-MS1) Matrix Spike *Source sample: 26A1333-01 (J-MW118_013026)								Prepared & Analyzed: 02/03/2026			
Total Organic Carbon (TOC)	90.3	1.00	mg/L	20.0	62.1	141	85-115	High Bias			
Matrix Spike Dup (BB60099-M Matrix Spike Dup *Source sample: 26A1333-01 (J-MW118_013026)								Prepared & Analyzed: 02/03/2026			
Total Organic Carbon (TOC)	90.3	1.00	mg/L	20.0	62.1	141	85-115	High Bias	0.0221	200	

Volatile Analysis Sample Containers

Lab ID	Client Sample ID	Volatile Sample Container
26A1333-01	J-MW118_013026	40mL Clear Vial (pre-pres.) HCl; Cool to 4° C

Sample and Data Qualifiers Relating to This Work Order

S-08	The recovery of this surrogate was outside of QC limits.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
QL-02	This LCS analyte is outside Laboratory Recovery limits due the analyte behavior using the referenced method. The reference method has certain limitations with respect to analytes of this nature.
J	Detected below the Reporting Limit but greater than or equal to the Method Detection Limit (MDL/LOD) or in the case of a TIC, the result is an estimated concentration.
ICVE	The value reported is ESTIMATED. The value is estimated due to its behavior during initial calibration verification (recovery exceeded 30% of expected value).
EXT-EM	The sample exhibited emulsion formation during the extraction process. This may affect surrogate recoveries.
CCVE	The value reported is ESTIMATED. The value is estimated due to its behavior during continuing calibration verification (>20% Difference for average Rf or >20% Drift for quadratic fit).
CAL-E	The value reported is ESTIMATED. The value is estimated due to its behavior during initial calibration (average Rf>20%)
B	Analyte is found in the associated analysis batch blank. For volatiles, methylene chloride and acetone are common lab contaminants.
/\	Analyte is not certified but the state of sample origination offer certification for the Analyte

Definitions and Other Explanations

*	Analyte is not certified or the state of the samples origination does not offer certification for the Analyte.
ND	NOT DETECTED - the analyte is not detected at the Reported to level (LOQ/RL or LOD/MDL)
RL	REPORTING LIMIT - the minimum reportable value based upon the lowest point in the analyte calibration curve.
LOQ	LIMIT OF QUANTITATION - the minimum concentration of a target analyte that can be reported within a specified degree of confidence. This is the lowest point in an analyte calibration curve that has been subjected to all steps of the processing/analysis and verified to meet defined criteria. This is based upon NELAC 2009 Standards and applies to all analyses.
LOD	LIMIT OF DETECTION - a verified estimate of the minimum concentration of a substance in a given matrix that an analytical process can reliably detect. This is based upon NELAC 2009 Standards and applies to all analyses conducted under the auspices of EPA SW-846.
MDL	METHOD DETECTION LIMIT - a statistically derived estimate of the minimum amount of a substance an analytical system can reliably detect with a 99% confidence that the concentration of the substance is greater than zero. This is based upon 40 CFR Part 136 Appendix B and applies only to EPA 600 and 200 series methods.
Reported to	This indicates that the data for a particular analysis is reported to either the LOD/MDL, or the LOQ/RL. In cases where the "Reported to" is located above the LOD/MDL, any value between this and the LOQ represents an estimated value which is "J" flagged accordingly. This applies to volatile and semi-volatile target compounds only.
NR	Not reported
RPD	Relative Percent Difference
Wet	The data has been reported on an as-received (wet weight) basis
Low Bias	Low Bias flag indicates that the recovery of the flagged analyte is below the laboratory or regulatory lower control limit. The data user should take note that this analyte may be biased low but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
High Bias	High Bias flag indicates that the recovery of the flagged analyte is above the laboratory or regulatory upper control limit. The data user should take note that this analyte may be biased high but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.

Non-Dir. Non-dir. flag (Non-Directional Bias) indicates that the Relative Percent Difference (RPD) (a measure of precision) among the MS and MSD data is outside the laboratory or regulatory control limit. This alerts the data user where the MS and MSD are from site-specific samples that the RPD is high due to either non-homogeneous distribution of target analyte between the MS/MSD or indicates poor reproducibility for other reasons.

If EPA SW-846 method 8270 is included herein it is noted that the target compound N-nitrosodiphenylamine (NDPA) decomposes in the gas chromatographic inlet and cannot be separated from diphenylamine (DPA). These results could actually represent 100% DPA, 100% NDPA or some combination of the two. For this reason, ALS reports the combined result for n-nitrosodiphenylamine and diphenylamine for either of these compounds as a combined concentration as Diphenylamine.

If Total PCBs are detected and the target aroclors reported are "Not detected", the Total PCB value is reported due to the presence of either or both Aroclors 1262 and 1268 which are non-target aroclors for some regulatory lists.

2-chloroethylvinyl ether readily breaks down under acidic conditions. Samples that are acid preserved, including standards will exhibit breakdown. The data user should take note.

Certification for pH is no longer offered by NYDOH ELAP.

Semi-Volatile and Volatile analyses are reported down to the LOD/MDL, with values between the LOD/MDL and the LOQ being "J" flagged as estimated results.

For analyses by EPA SW-846-8270D, the Limit of Quantitation (LOQ) reported for benzidine is based upon the lowest standard used for calibration and is not a verified LOQ due to this compound's propensity for oxidative losses during extraction/concentration procedures and non-reproducible chromatographic performance.

Corrective Action: All vials on Trip Blank sample TB02_013026 received broken.

Field Chain-of-Custody Record

ALS environmental

ALS' Standard Terms & Conditions are listed on the back side of this document. This legal document serves as your written authorization for ALS to proceed with the analyses requested below. Your signature binds you to ALS' Standard Terms & Conditions.

120 Research Drive Stratford, CT 06615 132-02 89th Ave Queens, NY 11418 56 Church Hill Rd. #2 Newtown, CT 06470 2161 Whitesville Rd Toms River, NJ 08755 clientservices@yorklab.com 800-306-YORK 800-306-9675

ALS Project Number: 26A1333

Page 1 of 1

Report To:	Invoice To:
Company: Langan	Company:
Address: ~~[illegible]~~ 300 5th Ave Floor 8 NY NY 10001	Address: SAME
Phone.: 212-479-5400	Phone.:
Contact: Ellie Geary	Contact:
E-mail: egeary@langan.com	E-mail:

YOUR Project Name / Number: Willets Point development L-Parcel 1701A-1605

PO Number:

Samples Collected From: NY X | CT | NJ | PA | Other: (please specify)

Turn-Around Time: RUSH - Next Day | RUSH - Two Day | RUSH - Three Day | RUSH - Four Day | RUSH - Five Day | Standard (6-9 Day) X | PFAS Standard 7-10 Day

Please print clearly and legibly. All information must be complete. Samples will not be logged in and the turn-around-time clock will not begin until any questions by ALS are resolved.

Olivia O'Donnell

Samples Collected by: (print AND sign your name)

Matrix Codes: S - soil/solid/sludge; GW - groundwater; DW - drinking water; SW - surface water; WW - wastewater; O - Oil; Other

Preservative (please list number of containers)

Analyses Requested

Sample Identification	Date	Time	Matrix	Unpreserved	HCl (hydrochloric acid)	MeOH (methanol)	HNO_3 (nitric acid)	H_2SO_4 (sulfuric acid)	NaOH (sodium hydroxide)	$Na_2S_2O_3$ (sodium thio.)	Trizma	Ammonium Acetate	Other:	VOCs Part 375/TI	SVOCs	TOC	Grab or Comp. G/C
J-MW 11S-013026	1/30/26	10:30	GW		X									X	X	X	
TB02-013026	↓	—	AQ											X			

Report Type (circle): QA Report; Summary (Results Only); NY ASP B Package; NJ Reduced; NJ DKQP; NJ Full; CT RCP

EDD Type (circle): EQuIS (standard); NYSDEC EQuIS; NJDEP SRP Haz Site; Standard Excel; CMDP; Other:

Regulatory Comparative: Compared to the following Regulation(s): (please fill in)

Field Filtered | Lab Filtered

Comments: Please include datamanagement@langan.com eburgess@langan.com, Lclements@langan.com

Samples iced/chilled at time of lab pickup? circle Yes or No

Lab Sample Receiving Checklist (to be completed by the receiving laboratory only) Circle Y / N

Custody Seals: Y / N Containers Intact: Y / N COC/Labels Agree: Y / N Preservation Confirmed: Y / N 1-30

COC Complete: Y / N COC Received: Y / N Appropriate Sample Volumes: Y / N Appropriate Sample Containers: Y / N

Cooler Temperature Confirmed: Y / N Samples Submitted within Holding Times: Y / N Corrective Action Form Required: Y / N

Samples Relinquished by / Company	Date/Time	1. Samples Received by / Company	Date/Time	2. Samples Relinquished by / Company	Date/Time
Olivia O'Donnell	1/30/26 15:00	[signature]	1-30-26 15:00	[signature]	1-30-26 19:25
Samples Received by / Company	Date/Time	3. Samples Relinquished by / Company	Date/Time	3. Samples Received by / Company	Date/Time
Samples Relinquished by / Company	Date/Time	4. Samples Received by / Company	Date/Time	Samples Received in LAB by	Date/Time / Temperature
				Fernando W	1-30-26 19:25 / 3.8 Degrees C

Field Chain-of-Custody Record

ALS environmental

ALS' Standard Terms & Conditions are listed on the back side of this document. This legal document serves as your written authorization for ALS to proceed with the analyses requested below. Your signature binds you to ALS' Standard Terms & Conditions.

120 Research Drive Stratford, CT 06615 132-02 89th Ave Queens, NY 11418 56 Church Hill Rd. #2 Newtown, CT 06470 2161 Whitesville Rd Toms River, NJ 08755 clientservices@yorklab.com 800-306-YORK 800-306-9675

ALS Project Number: 26A1333

Page 1 of 1

Report To:	Invoice To:
Company: Langan	Company:
Address: ~~3~~ 360 9th Ave Floor 8 NY NY 10001	Address: SAME
Phone.: 212-479-5400	Phone.:
Contact: Ellie Geary	Contact:
E-mail: egeary@langan.com	E-mail:

YOUR Project Name / Number: Willets Point development L-Parcel 1701A-1605

PO Number:

Samples Collected From: NY X | CT | Other: (please specify) | NJ | PA

Turn-Around Time: RUSH - Next Day | RUSH - Two Day | RUSH - Three Day | RUSH - Four Day | RUSH - Five Day | Standard (6-9 Day) X | PFAS Standard 7-10 Day

Please print clearly and legibly. All information must be complete. Samples will not be logged in and the turn-around-time clock will not begin until any questions by ALS are resolved.

Olivia O'Donnell

Samples Collected by: (print AND sign your name)

Matrix Codes: S - soil/solid/sludge; GW - groundwater; DW - drinking water; SW - surface water; WW - wastewater; O - Oil; Other

Preservative (please list number of containers)

Analyses Requested

Sample Identification	Date	Time	Matrix	Unpreserved	HCl (hydrochloric acid)	MeOH (methanol)	HNO_3 (nitric acid)	H_2SO_4 (sulfuric acid)	NaOH (sodium hydroxide)	$Na_2S_2O_3$ (sodium thio.)	Trizma	Ammonium Acetate	Other:	VOCs Part 375/TI	SVOCs	TOC	Grab or Comp. G/C
J-MW 11S-013026	1/30/26	10:30	GW		X									X	X	X	
TB02-013026	↓	—	AQ											X			

Report Type (circle): QA Report; Summary (Results Only); NY ASP B Package; NJ Reduced; NJ DKQP; NJ Full; CT RCP

EDD Type (circle): EQuIS (standard); NYSDEC EQuIS; NJDEP SRP Haz Site; Standard Excel; CMDP; Other:

Regulatory Comparative: Compared to the following Regulation(s): (please fill in)

Field Filtered | Lab Filtered

Comments: Please include datamanagement@langan.com eburgess@langan.com, Lclements@langan.com

Samples iced/chilled at time of lab pickup? circle Yes or No

Lab Sample Receiving Checklist (to be completed by the receiving laboratory only) Circle Y / N

Custody Seals: Y / N | Containers Intact: Y / N | COC/Labels Agree: Y / N | Preservation Confirmed: Y / N 1-30

COC Complete: Y / N | COC Received: Y / N | Appropriate Sample Volumes: Y / N | Appropriate Sample Containers: Y / N

Cooler Temperature Confirmed: Y / N | Samples Submitted within Holding Times: Y / N | Corrective Action Form Required: Y / N

Samples Relinquished by / Company	Date/Time	1. Samples Received by / Company	Date/Time	2. Samples Relinquished by / Company	Date/Time
Olivia O'Donnell	1/30/26 15:00	[signature]	1-30-26 15:00	[signature]	1-30-26 19:25
Samples Received by / Company	Date/Time	3. Samples Relinquished by / Company	Date/Time	3. Samples Received by / Company	Date/Time
Samples Relinquished by / Company	Date/Time	4. Samples Received by / Company	Date/Time	Samples Received in LAB by	Date/Time / Temperature
				Fernando W	1-30-26 19:25 / 3.8 Degrees C

ATTACHMENT H

Titration Data

Attachment H
Treatability Study Report
Titration Data

Willets Point Development L-Parcel
Queens, New York
NYSDEC BCP No. C241146H
Langan Project No.170197605

Acetic Acid for pH 7	J-MW118 + TS-01						
Sample	**Wet Soil**	**Groundwater**	**Total Mass**	**Cumulative mmol of Acetic Acid**	**mmol of Acetic Acid per mL of GW**	**mmol of Acetic Acid per g of Soil**	**mL of Acetic Acid per kg of Soil or per L of GW**
	g	**g**	**g**	**mmol**	**mmol/mL**	**mmol/g**	**mL**
Ground water		100	100	0.3	0.003	-	0.2
Soil + Ground water	25	80	105	3.5	-	0.03	-
Soil	25	80	105	3.2	-	0.13	7.2

Acetic Acid for pH 7	J-MW118 + TS-02						
Sample	**Wet Soil**	**Groundwater**	**Total Mass**	**Cumulative mmol of Acetic Acid**	**mmol of Acetic Acid per mL of GW**	**mmol of Acetic Acid per g of Soil**	**mL of Acetic Acid per kg of Soil or per L of GW**
	g	**g**	**g**	**mmol**	**mmol/mL**	**mmol/g**	**mL**
Ground water		100	100	0.3	0.003	-	0.2
Soil + Ground water	25	80	105	6.1	-	0.06	-
Soil	25	80	105	5.8	-	0.23	13.4

Acetic Acid for pH 7	J-MW118 + TS-03						
Sample	**Wet Soil**	**Groundwater**	**Total Mass**	**Cumulative mmol of Acetic Acid**	**mmol of Acetic Acid per mL of GW**	**mmol of Acetic Acid per g of Soil**	**mL of Acetic Acid per kg of Soil or per L of GW**
	g	**g**	**g**	**mmol**	**mmol/mL**	**mmol/g**	**mL**
Ground water		100	100	0.3	0.003	-	0.2
Soil + Ground water	25	80	105	2.8	-	0.03	-
Soil	25	80	105	2.5	-	0.10	5.8

Notes:
Beige colored cells were filled with the tiration data
Green colored cells represent the final output
GW - groundwater
S.U. - standard units
mL - milliliters
g/mL - grams per milliliter
mol/L - moles per liter
g - grams
L - liter
mmol - millimoles
mmol/mL - millimoles per milliliter
mmol/g - millimoles per gram
Density of Acetic Acid (99% assay) is 1.05 g/mL
Molarity of Acetic Acid (99% assay) is 17.3 mol/L

Attachment H
Treatability Study Report
Titration Data

Willets Point Development L-Parcel
Queens, New York
NYSDEC BCP No. C241146H
Langan Project No.170197605

Lactic Acid for pH 7	J-MW118 + TS-01						
Sample	**Wet Soil**	**Groundwater**	**Total Mass**	**Cumulative mmol of Lactic Acid**	**mmol of Lactic Acid per mL of GW**	**mmol of Lactic Acid per g of Soil**	**mL of Lactic Acid per kg of Soil or per L of GW**
	g	**g**	**g**	**mmol**	**mmol/mL**	**mmol/g**	**mL**
Ground water		100	100	0.6	0.006	-	0.5
Soil + Ground water	25	80	105	5.2	-	0.05	-
Soil	25	80	105	4.8	-	0.19	16.5

Lactic Acid for pH 7	J-MW118 + TS-02						
Sample	**Wet Soil**	**Groundwater**	**Total Mass**	**Cumulative mmol of Lactic Acid**	**mmol of Lactic Acid per mL of GW**	**mmol of Lactic Acid per g of Soil**	**mL of Lactic Acid per kg of Soil or per L of GW**
	g	**g**	**g**	**mmol**	**mmol/mL**	**mmol/g**	**mL**
Ground water		100	100	0.6	0.006	-	0.5
Soil + Ground water	25	80	105	12.3	-	0.12	-
Soil	25	80	105	11.8	-	0.47	41.5

Lactic Acid for pH 7	J-MW118 + TS-03						
Sample	**Wet Soil**	**Groundwater**	**Total Mass**	**Cumulative mmol of Lactic Acid**	**mmol of Lactic Acid per mL of GW**	**mmol of Lactic Acid per g of Soil**	**mL of Lactic Acid per kg of Soil or per L of GW**
	g	**g**	**g**	**mmol**	**mmol/mL**	**mmol/g**	**mL**
Ground water		100	100	0.6	0.006	-	0.5
Soil + Ground water	25	80	105	2.6	-	0.02	-
Soil	25	80	105	2.2	-	0.09	7.6

Notes:
Beige colored cells were filled with the tiration data
Green colored cells represent the final output
GW - groundwater
S.U. - standard units
mL - milliliters
g/mL - grams per milliliter
mol/L - moles per liter
g - grams
L - liter
mmol - millimoles
mmol/mL - millimoles per milliliter
mmol/g - millimoles per gram
Density of Lactic Acid (85% assay) is 1.21 g/mL
Molarity of Lactic Acid (85% assay) is 11.4 mol/L

Attachment H
Treatability Study Report
Titration Data

Willets Point Development L-Parcel
Queens, New York
NYSDEC BCP No. C241146H
Langan Project No.170197605
March 2026

NaOH for pH >10.5	J-MW118 + TS-01						
Sample	**Wet Soil**	**Groundwater**	**Total Mass**	**Cumulative mmoles of NaOH**	**mmoles of NaOH per mL of GW**	**mmoles of NaOH per g of Soil**	**mL of 10 N NaOH per kg of Soil or per L of GW**
	g	**g**	**g**	**mmole**	**mmole/ml**	**mmole/g**	**mL**
Ground water		100	100	1.0	0.010	-	1.0
Soil + Ground water	25	80	105	0.7	-	0.007	-
Soil	25	80	105	-0.1	-	-0.004	-0.4

NaOH for pH >10.5	J-MW118 + TS-02						
Sample	**Wet Soil**	**Groundwater**	**Total Mass**	**Cumulative mmoles of NaOH**	**mmoles of NaOH per mL of GW**	**mmoles of NaOH per g of Soil**	**mL of 10 N NaOH per kg of Soil or per L of GW**
	g	**g**	**g**	**mmole**	**mmole/ml**	**mmole/g**	**mL**
Ground water		100	100	1.0	0.010	-	1.0
Soil + Ground water	25	80	105	0.4	-	0.004	-
Soil	25	80	105	-0.4	-	-0.016	-1.6

NaOH for pH >10.5	J-MW118 + TS-03						
Sample	**Wet Soil**	**Groundwater**	**Total Mass**	**Cumulative mmoles of NaOH**	**mmoles of NaOH per mL of GW**	**mmoles of NaOH per g of Soil**	**mL of 10 N NaOH per kg of Soil or per L of GW**
	g	**g**	**g**	**mmole**	**mmole/ml**	**mmole/g**	**mL**
Ground water		100	100	1.0	0.010	-	1.0
Soil + Ground water	25	80	105	1.0	-	0.010	-
Soil	25	80	105	0.2	-	0.008	0.8

Notes:
Beige colored cells were filled with the tiration data.
Green colored cells represent the final output
N - normal
NaOH - Sodium Hydroxide
S.U. - standard units
GW - groundwater
L - liter
mL - milliliters
g - grams
mmole - millimoles
mmole/mL millimoles per milliliter
mmole/g - millimoles per gram

APPENDIX B

Safety Data Sheets

SAFETY DATA SHEET
Klozur ® KP

SDS # : 7727-21-1-12
Revision date: 2018-07-13
Format: NA
Version 1.01

1. PRODUCT AND COMPANY IDENTIFICATION

Product Identifier

Product Name Klozur ® KP

CAS-No 7727-21-1

Synonyms Potassium Peroxydisulfate; Dipotassium Peroxydisulfate; Peroxydisulfuric acid, dipotassium salt; Peroxydisulfuric acid, potassium salt.

Recommended use of the chemical and restrictions on use

Recommended Use: In situ and ex situ chemical oxidation of contaminants and compounds of concern for environmental remediation applications

Restrictions on Use No uses to be advised against were identified.

Manufacturer/Supplier

PeroxyChem LLC
2005 Market Street
Suite 3200
Philadelphia, PA 19103
Phone: +1 267/ 422-2400 (General Information)
E-Mail: sdsinfo@peroxychem.com

Emergency telephone numbers

For leak, fire, spill or accident emergencies, call:
1 800 / 424 9300 (CHEMTREC - U.S.A.)
1 703 / 527 3887 (CHEMTREC - Collect - All Other Countries)
4001 - 204937 (CHEMTREC - PRC)
1 303/ 389-1409 (Medical - U.S. - Call Collect)

2. HAZARDS IDENTIFICATION

Classification

OSHA Regulatory Status
This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute toxicity - Oral	Category 4
Skin corrosion/irritation	Category 2
Serious eye damage/eye irritation	Category 2B
Respiratory sensitization	Category 1
Skin sensitization	Category 1
Specific target organ toxicity (single exposure)	Category 3
Oxidizing Solids	Category 3

GHS Label elements, including precautionary statements

EMERGENCY OVERVIEW

Danger

Hazard Statements
H334 - May cause allergy or asthma symptoms or breathing difficulties if inhaled
H335 - May cause respiratory irritation
H320 - Causes eye irritation
H315 - Causes skin irritation
H317 - May cause an allergic skin reaction
H302 - Harmful if swallowed
H272 - May intensify fire; oxidizer

Precautionary Statements - Prevention
P261 - Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray
P285 - In case of inadequate ventilation wear respiratory protection
P271 - Use only outdoors or in a well-ventilated area
P280 - Wear protective gloves/ protective clothing
P264 - Wash face, hands and any exposed skin thoroughly after handling
P210 - Keep away from heat/sparks/open flames/hot surfaces. - No smoking
P220 - Keep/Store away from clothing/combustible materials
P221 - Take any precaution to avoid mixing with combustibles

Precautionary Statements - Response
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P337 + P313 - If eye irritation persists: Get medical advice/ attention
P302 + P352 - IF ON SKIN: Wash with plenty of water.
P333 + P313 - If skin irritation or rash occurs: Get medical advice/ attention
P304 + P341 - IF INHALED: If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing
P342 + P311 - If experiencing respiratory symptoms: Call a POISON CENTER or doctor
P301 + P312 - IF SWALLOWED: Call a POISON CENTER or doctor if you feel unwell
P330 - Rinse mouth
P370 + P378 - In case of fire: Use water for extinction

Precautionary Statements - Storage
P403 + P233 - Store in a well-ventilated place. Keep container tightly closed

Hazards not otherwise classified (HNOC)
No hazards not otherwise classified were identified.

Other Information
Risk of decomposition by heat or by contact with incompatible materials

Unknown acute toxicity
0% of the mixture consists of ingredient(s) of unknown toxicity

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula K2O8S2 and $K_2 S_2 O_8$

Chemical name	CAS-No	Weight %
Potassium Persulfate	7727-21-1	> 98
Potassium Sulfate	7778-80-5	< 2

4. FIRST AID MEASURES

General Advice Remove from exposure, lie down. Show this material safety data sheet to the doctor in attendance.

Eye Contact Rinse thoroughly with plenty of water for at least 15 minutes, lifting lower and upper eyelids intermittently. Consult a physician. In case of contact, immediately flush eyes with plenty of water. If symptoms persist, call a physician.

Skin Contact Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Get medical attention if irritation develops and persists.

Inhalation Remove from exposure, lie down. If breathing is irregular or stopped, administer artificial respiration. Call a physician immediately.

Ingestion Do NOT induce vomiting. Call a physician or poison control center immediately. Rinse mouth. Drink 1 or 2 glasses of water.

Most important symptoms and effects, both acute and delayed Itching; Redness; Coughing and/ or wheezing.

Indication of immediate medical attention and special treatment needed, if necessary Treat symptomatically

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media Water. Cool containers with flooding quantities of water until well after fire is out.

Unsuitable extinguishing media Do not use carbon dioxide or other gas filled fire extinguishers; they will have little effect on decomposing persulfate.

Specific Hazards Arising from the Chemical Decomposes under fire conditions to release oxygen that intensifies the fire.

Explosion data
Sensitivity to Mechanical Impact Not sensitive.
Sensitivity to Static Discharge Not sensitive.

Protective equipment and precautions for firefighters As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions Keep off any unprotected persons. Avoid contact with the skin and the eyes. Avoid breathing dust. Wear personal protective equipment.

Other Never add other substances or combustible waste to product residues.

Environmental Precautions Knock down dust with water spray. Avoid penetration into waterways, sewers, soil or

groundwater. Local authorities should be advised if significant spillages cannot be contained.

Methods for Containment Vacuum, shovel or pump waste into a drum and label contents for disposal. Avoid dust formation. Store in closed container.

Methods for cleaning up Clean up spill area and treat as special waste. Dispose of waste as indicated in Section 13.

7. HANDLING AND STORAGE

Handling Wear personal protective equipment. Avoid breathing dust. Handle product only in closed system or provide appropriate exhaust ventilation at machinery. Avoid contact with skin and eyes. Remove and wash contaminated clothing before re-use.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat. Do not store near combustible materials. Avoid contamination of opened product. Keep away from food, drink and animal feedingstuffs. Avoid formation and deposition of dust.

Incompatible products Bases, Halides, Oxidizing agents, Strong reducing agents, Combustible materials.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines .

Chemical name	ACGIH TLV	OSHA PEL	NIOSH	Mexico
Potassium Persulfate 7727-21-1	TWA: 0.1 mg/m³	-	-	-
Chemical name	**British Columbia**	**Quebec**	**Ontario TWAEV**	**Alberta**
Potassium Persulfate 7727-21-1	TWA: 0.1 mg/m³	-	TWA: 0.1 mg/m³	TWA: 0.1 mg/m³

Appropriate engineering controls

Engineering measures Provide local exhaust or general ventilation adequate to maintain exposures below permissable exposure limits.

Individual protection measures, such as personal protective equipment

Eye/Face Protection Eye protection recommended. Chemical goggles consistent with EN 166 or equivalent.

Skin and Body Protection Wear long-sleeved shirt, long pants, socks, and shoes.

Hand Protection Protective gloves: Neoprene gloves, Polyvinylchloride, Natural Rubber.

Respiratory Protection If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn: particulate filtering facepiece respirators.

Hygiene measures Keep away from food, drink and animal feeding stuffs. Do not eat, drink or smoke when using this product. Wash hands before breaks and after shifts. Keep work clothes separate, remove contaminated clothing - launder after open handling of product.

General information Protective engineering solutions should be implemented and in use before personal protective equipment is considered.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance Crystalline solid

Physical State	Solid
Color	White
Odor	odorless
Odor threshold	Not applicable
pH	6.4 (1% solution)
Melting point/freezing point	> 100 °C (Decomposes)
Boiling Point/Range	Decomposes upon heating
Flash point	Not applicable
Evaporation Rate	No information available
Flammability (solid, gas)	Not flammable
Flammability Limit in Air	Not applicable
Upper flammability limit:	No information available
Lower flammability limit:	No information available
Vapor pressure	6.07E-30 mm Hg at 25ºC
Vapor density	No information available
Density	2.48 g/cm³ (crystal density)
Specific gravity	No information available
Water solubility	5.6 % @ 25 °C
Solubility in other solvents	No information available
Partition coefficient	No information available (inorganic)
Autoignition temperature	No evidence of combustion up to 600 °C
Decomposition temperature	> 100 °C (assume)
Viscosity, kinematic	No information available (Solid)
Viscosity, dynamic	No information available
Explosive properties	Not explosive
Oxidizing properties	oxidizer
Molecular weight	270.31
Bulk density	1.30 g/cm³ (loose)

10. STABILITY AND REACTIVITY

Reactivity Strong oxidizer. Oxidizer. Contact with other material may cause fire.

Chemical Stability Decomposition can occur on exposure to heat or moisture.

Possibility of Hazardous Reactions Use of persulfates in chemical reactions requires appropriate precautions and design considerations for pressure and thermal relief.

Decomposing persulfates will evolve large volumes of gas and/or vapor, can accelerate exponentially with heat generation, and create significant and hazardous pressures if contained and not properly controlled or mitigated.

Use with alcohols in the presence of water has been demonstrated to generate conditions that require rigorous adherence to process safety methods and standards to prevent escalation to an uncontrolled reaction.

Hazardous polymerization Hazardous polymerization does not occur.

Conditions to avoid Moisture; Heat. (decomposes at temperatures >100 °C).

Incompatible materials Bases, Halides, Oxidizing agents, Strong reducing agents, Combustible materials.

Hazardous Decomposition Products Incomplete combustion and thermolysis may produce gases of varying toxicity such as carbon monoxide, carbon dioxide, various hydrocarbons, aldehydes and soot.

11. TOXICOLOGICAL INFORMATION

Product Information

Unknown acute toxicity 0% of the mixture consists of ingredient(s) of unknown toxicity

LD50 Oral	1130 mg/kg (rat) (Potassium Persulfate)
LD50 Dermal	> 10000 10,000 mg/kg (rat) (Potassium Persulfate)

LC50 Inhalation > 42.9 mg/L (rat) (Potassium Persulfate)

Serious eye damage/eye irritation Irritating to eyes.
Skin corrosion/irritation Not irritating in animal studies.

Sensitization Sensitizing to skin and respiratory system.

Component Information

Chemical name	LD50 Oral	LD50 Dermal	LC50 Inhalation	NOAEL Oral Value
Potassium Persulfate (7727-21-1)	1130 mg/kg (rat)	>10,000 kg/kg (rat)	> 42.9 mg/L (rat)	
Potassium Sulfate (7778-80-5)	= 6600 mg/kg (Rat)			

Information on toxicological effects

Symptoms No information available.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Carcinogenicity Did not show carcinogenic effects in animal experiments.

Mutagenicity In vivo tests did not show mutagenic effects.

Reproductive toxicity This product is not recognized as reprotox by Research Agencies.

STOT - single exposure May cause respiratory irritation.
STOT - repeated exposure Not classified.
Subchronic toxicity Oral (NOAEL) = 131.5 mg/kg bw (Potassium Persulfate)
Inhalation (NOAEC) = 10.3 mg/m^3 (Ammonium Persulfate)
Dermal: No data available

Target organ effects Eyes, Skin, Respiratory System.

Aspiration hazard No information available.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Ecotoxicity effects Not expected to have significant environmental effects, based on data for similar substances.

Potassium Persulfate (7727-21-1)				
Active Ingredient(s)	Duration	Species	Value	Units
Potassium persulfate	96 h LC50	Onchorhyncus mykiss	76.3	mg/L
Potassium persulfate	48 h EC50	Water flea	120	mg/L
Potassium persulfate	72 h EC50	Marine algae (Phaeodacttylum tricornutum)	136	mg/L
Potassium persulfate	96 h LC50	Turbot (Scophthalmus maximus)	107.6	mg/L
Potassium persulfate	18 h EC10	Pseudonomas putida	36	mg/L
Potassium persulfate	5 d	Abra Alba	11	mg/L
Potassium persulfate	96 h LC50	Grass shrimp	391	mg/L
Potassium persulfate	24 h EC50	Daphnia magna	635.7	mg/L

Persistence and degradability Biodegradability does not pertain to inorganic substances.

Bioaccumulation Does not bioaccumulate.

Mobility Dissociates into ions.

Other Adverse Effects None known.

13. DISPOSAL CONSIDERATIONS

Waste disposal methods This material, as supplied, is a hazardous waste according to federal regulations (40 CFR 261). It must undergo special treatment, e.g. at suitable disposal site, to comply with local regulations.

US EPA Waste Number D001.

Contaminated Packaging Dispose of in accordance with local regulations.

14. TRANSPORT INFORMATION

DOT

UN/ID no 1492
Proper Shipping Name Potassium persulfate
Hazard class 5.1
Packing Group III

TDG

UN/ID no 1492
Proper Shipping Name Potassium persulfate
Hazard class 5.1
Packing Group III

ICAO/IATA

UN/ID no 1492
Proper Shipping Name Potassium persulfate
Hazard class 5.1

Packing Group	III

IMDG/IMO

UN/ID no	1492
Proper Shipping Name	Potassium persulfate
Hazard class	5.1
Packing Group	III

ADR/RID

UN/ID no	1492
Proper Shipping Name	Potassium persulfate
Hazard class	5.1
Packing Group	III

ADN

Proper Shipping Name	Potassium persulfate
Hazard class	5.1
Packing Group	III

15. REGULATORY INFORMATION

U.S. Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

SARA 311/312 Hazard Categories
This product is not subject to reporting under the Emergency Planning and Community Right-to-Know rule.

Clean Water Act
This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

CERCLA/EPCRA
This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material

US State Regulations

U.S. State Right-to-Know Regulations
This product contains the following substances regulated under state Right-to-Know laws:

Chemical name	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Potassium Persulfate	X	X	X		X

California Proposition 65
This product does not contain any Proposition 65 chemicals

CANADA

Environmental Emergencies
This product contains no substances listed under Canada's Environmental Emergency regulations.

Canadian National Pollutant Release Inventory
This product contains no substances reportable under Canada's National Pollutant Release Inventory regulations.

International Inventories

Component	TSCA (United States)	DSL (Canada)	EINECS/ELINCS (Europe)	ENCS (Japan)	China (IECSC)	KECL (Korea)	PICCS (Philippines)	AICS (Australia)	NZIoC (New Zealand)
Potassium Persulfate 7727-21-1 (> 98)	X	X	X	X	X	X	X	X	X
Potassium Sulfate 7778-80-5 (< 2)	X	X	X	X	X	X	X	X	X

Mexico

Mexico - Grade Slight risk, Grade 1

16. OTHER INFORMATION

NFPA	**Health Hazards** 1	**Flammability** 0	**Stability** 1	**Special Hazards** OX
HMIS	**Health Hazards** 1	**Flammability** 0	**Physical hazard** 1	**Special precautions** J

NFPA/HMIS Ratings Legend Severe = 4; Serious = 3; Moderate = 2; Slight = 1; Minimal = 0
Protection=J (Safety goggles, gloves, apron, combination dust and vapor respirator)

Revision date: 2018-07-13
Revision note SDS sections updated: 3

Disclaimer

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Prepared By:

PeroxyChem
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End of Safety Data Sheet

SAFETY DATA SHEET
Klozur® SP

SDS # : 7775-27-1-12
Revision date: 2021-10-14
Format: NA
Version 1.06

1. PRODUCT AND COMPANY IDENTIFICATION

Product Identifier

Product Name Klozur® SP

CAS-No 7775-27-1

Synonyms Sodium Peroxydisulfate; Disodium Peroxydisulfate; Peroxydisulfuric acid, disodium salt; Peroxydisulfuric acid, sodium salt.

Recommended use of the chemical and restrictions on use

Recommended Use: In situ and ex situ chemical oxidation of contaminants and compounds of concern for environmental remediation applications

Restrictions on Use No uses to be advised against were identified.

Manufacturer/Supplier

Evonik Active Oxygens, LLC
2005 Market Street
Suite 3200
Philadelphia, PA 19103
Phone: +1 267/ 422-2400 (General Information)
E-Mail: Product-regulatory-services@evonik.com

Emergency telephone numbers

For leak, fire, spill or accident emergencies, call:
1 800 / 424 9300 (CHEMTREC - U.S.A.)
1 703 / 527 3887 (CHEMTREC - Collect - All Other Countries)
+1 303/ 389-1409 (Medical - U.S. - Call Collect)

2. HAZARDS IDENTIFICATION

Classification

OSHA Regulatory Status
This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute toxicity - Oral	Category 4
Skin corrosion/irritation	Category 2
Serious eye damage/eye irritation	Category 2B
Respiratory sensitization	Category 1
Skin sensitization	Category 1
Specific target organ toxicity (single exposure)	Category 3
Oxidizing Solids	Category 3

GHS Label elements, including precautionary statements

EMERGENCY OVERVIEW

Danger

Hazard Statements
H334 - May cause allergy or asthma symptoms or breathing difficulties if inhaled
H335 - May cause respiratory irritation
H320 - Causes eye irritation
H315 - Causes skin irritation
H317 - May cause an allergic skin reaction
H302 - Harmful if swallowed
H272 - May intensify fire; oxidizer

Precautionary Statements - Prevention
P261 - Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray
P285 - In case of inadequate ventilation wear respiratory protection
P280 - Wear protective gloves/ protective clothing/ eye protection/ face protection
P264 - Wash face, hands and any exposed skin thoroughly after handling
P272 - Contaminated work clothing should not be allowed out of the workplace
P270 - Do not eat, drink or smoke when using this product
P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking
P220 - Keep away from clothing and other combustible materials

Precautionary Statements - Response
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P337 + P313 - If eye irritation persists: Get medical advice/ attention
P302 + P352 - IF ON SKIN: Wash with plenty of water.
P333 + P313 - If skin irritation or rash occurs: Get medical advice/ attention
P362 + P364 - Take off all contaminated clothing and wash it before reuse
P304 + P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing
P342 + P311 - If experiencing respiratory symptoms: Call a POISON CENTER or doctor
P301 + P312 - IF SWALLOWED: Call a POISON CENTER or doctor if you feel unwell
P330 - Rinse mouth

P370 + P378 - In case of fire: Use water for extinction

Precautionary Statements - Storage
P403 + P233 - Store in a well-ventilated place. Keep container tightly closed
P405 - Store locked up

Precautionary Statements - Disposal
P501 - Dispose of contents/ container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)
No hazards not otherwise classified were identified.

Other Information
Risk of decomposition by heat or by contact with incompatible materials

Unknown acute toxicity
0% of the mixture consists of ingredient(s) of unknown toxicity

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula Na2O8S2

Chemical name	CAS-No	Weight %
Sodium Persulfate	7775-27-1	> 99
Sodium sulfate	7757-82-6	< 1

4. FIRST AID MEASURES

General Advice Remove from exposure, lie down. Show this material safety data sheet to the doctor in attendance.

Eye Contact Rinse thoroughly with plenty of water for at least 15 minutes, lifting lower and upper eyelids intermittently. Consult a physician. In case of contact, immediately flush eyes with plenty of water. If symptoms persist, call a physician.

Skin Contact Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Get medical attention if irritation develops and persists.

Inhalation Remove from exposure, lie down. If breathing is irregular or stopped, administer artificial respiration. Call a physician immediately.

Ingestion Do NOT induce vomiting. Call a physician or poison control center immediately. Rinse mouth. Drink 1 or 2 glasses of water.

Most important symptoms and effects, both acute and delayed Itching; Redness; Coughing and/ or wheezing.

Indication of immediate medical attention and special treatment needed, if necessary Treat symptomatically

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media Water. Cool containers with flooding quantities of water until well after fire is out.

Unsuitable extinguishing media Do not use carbon dioxide or other gas filled fire extinguishers; they will have little effect on decomposing persulfate.

Specific Hazards Arising from the Chemical Decomposes under fire conditions to release oxygen that intensifies the fire.

Explosion data
Sensitivity to Mechanical Impact Not sensitive.
Sensitivity to Static Discharge Not sensitive.

Protective equipment and precautions for firefighters As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions Keep off any unprotected persons. Avoid contact with the skin and the eyes. Avoid breathing dust. Wear personal protective equipment.

Other Never add other substances or combustible waste to product residues.

Environmental Precautions Knock down dust with water spray. Avoid penetration into waterways, sewers, soil or groundwater. Local authorities should be advised if significant spillages cannot be contained.

Methods for Containment Vacuum, shovel or pump waste into a drum and label contents for disposal. Avoid dust formation. Store in closed container.

Methods for cleaning up Clean up spill area and treat as special waste. Dispose of waste as indicated in Section 13.

7. HANDLING AND STORAGE

Handling Wear personal protective equipment. Avoid breathing dust. Handle product only in closed system or provide appropriate exhaust ventilation at machinery. Avoid contact with skin and eyes. Remove and wash contaminated clothing before re-use.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat. Do not store near combustible materials. Avoid contamination of opened product. Keep away from food, drink and animal feedingstuffs. Avoid formation and deposition of dust.

Incompatible products Bases, Halides, Oxidizing agents, Strong reducing agents, Combustible materials.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines .

Chemical name	ACGIH TLV	OSHA PEL	NIOSH	Mexico
Sodium Persulfate 7775-27-1	TWA: 0.1 mg/m³	-	-	-
Chemical name	**British Columbia**	**Quebec**	**Ontario TWAEV**	**Alberta**
Sodium Persulfate 7775-27-1	TWA: 0.1 mg/m³	-	TWA: 0.1 mg/m³	TWA: 0.1 mg/m³

Appropriate engineering controls

Engineering measures Ensure adequate ventilation, especially in confined areas.

Individual protection measures, such as personal protective equipment

Eye/Face Protection Eye protection recommended. Chemical goggles consistent with EN 166 or equivalent.

Skin and Body Protection Wear long-sleeved shirt, long pants, socks, and shoes.

Hand Protection Protective gloves: Neoprene gloves, Polyvinylchloride, Natural Rubber.

Respiratory Protection If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn: particulate filtering facepiece respirators.

Hygiene measures Keep away from food, drink and animal feeding stuffs. Do not eat, drink or smoke when using this product. Wash hands before breaks and after shifts. Keep work clothes separate, remove contaminated clothing - launder after open handling of product.

General information Protective engineering solutions should be implemented and in use before personal protective equipment is considered.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	Crystalline solid
Physical State	Solid
Color	White
Odor	odorless
Odor threshold	Not applicable
pH	6.0 (1% solution)
Melting point/freezing point	180 °C (Decomposes)
Boiling Point/Range	Decomposes on heating
Flash point	Not flammable
Evaporation Rate	Not applicable
Flammability (solid, gas)	Not flammable
Flammability Limit in Air	Not applicable
Upper flammability limit:	No information available
Lower flammability limit:	No information available
Vapor pressure	6.07E-30 mm Hg at 25ºC
Vapor density	No information available
Density	2.59 g/cm³ (crystal density)
Specific gravity	No information available
Water solubility	42 % @ 25 °C
Solubility in other solvents	No information available
Partition coefficient	No information available
Autoignition temperature	No evidence of combustion up to 600°C
Decomposition temperature	> 100 °C (assume)
Viscosity, kinematic	No information available (Solid)
Viscosity, dynamic	No information available
Explosive properties	Not explosive
Oxidizing properties	oxidizer

Other Information

Molecular weight	238.1
VOC content (%)	Not applicable
Bulk density	1.12 g/cm³ (loose)

10. STABILITY AND REACTIVITY

Reactivity Strong oxidizer. Oxidizer. Contact with other material may cause fire.

Chemical Stability Decomposition can occur on exposure to heat or moisture.

Possibility of Hazardous Reactions Use of persulfates in chemical reactions requires appropriate precautions and design considerations for pressure and thermal relief.

Decomposing persulfates will evolve large volumes of gas and/or vapor, can accelerate exponentially with heat generation, and create significant and hazardous pressures if contained and not properly controlled or mitigated.

Use with alcohols in the presence of water has been demonstrated to generate conditions that require rigorous adherence to process safety methods and standards to prevent escalation to an uncontrolled reaction.

Hazardous polymerization Hazardous polymerization does not occur.

Conditions to avoid Heat. (decomposes at 275 °C); Moisture.

Incompatible materials Bases, Halides, Oxidizing agents, Strong reducing agents, Combustible materials.

Hazardous Decomposition Products Oxygen which supports combustion; Sulfur oxides.

11. TOXICOLOGICAL INFORMATION

Product Information

Unknown acute toxicity 0% of the mixture consists of ingredient(s) of unknown toxicity

LD50 Oral 895 mg/kg (rat) (Sodium Persulfate)
LD50 Dermal > 10,000 mg/kg (rabbit) (Sodium Persulfate)
LC50 Inhalation > 5.1 mg/L (rat) (4-hr) (Sodium Persulfate)

Serious eye damage/eye irritation Irritating to eyes.
Skin corrosion/irritation Minimally irritating.

Sensitization Sensitizing to skin and respiratory system.

Component Information

Chemical name	LD50 Oral	LD50 Dermal	LC50 Inhalation	NOAEL Oral Value
Sodium sulfate (7757-82-6)	> 10000 mg/kg (Rat)			

Information on toxicological effects

Symptoms Symptoms of allergic reaction may include rash, itching, swelling and trouble breathing.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Irritating to eyes, respiratory system and skin.
corrosivity None.

Carcinogenicity Did not show carcinogenic effects in animal experiments.

Mutagenicity In vivo tests did not show mutagenic effects.

Reproductive toxicity This product is not recognized as reprotox by Research Agencies.

STOT - single exposure May cause respiratory irritation.
STOT - repeated exposure Not classified.
Subchronic toxicity Oral (NOAEL) = 131.5 mg/kg bw (Sodium Persulfate)
Inhalation (NOAEC) = 10.3 mg/m³ (Ammonium Persulfate) Dermal: No data available

Target organ effects Eyes, Skin, Respiratory System.

Aspiration hazard Not applicable.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Ecotoxicity effects

Sodium Persulfate (7775-27-1)				
Active Ingredient(s)	Duration	Species	Value	Units
Sodium Persulfate	96 h LC50	Rainbow trout	163	mg/L
Sodium Persulfate	48 h LC50	Daphnia magna	133	mg/L
Sodium Persulfate	96 h LC50	Grass shrimp	519	mg/L
Sodium Persulfate	72 h EC50	Algae Selenastrum capricornutum	116	mg/L

Persistence and degradability Biodegradability does not pertain to inorganic substances.

Bioaccumulation Does not bioaccumulate.

Mobility Dissociates into ions.

Other Adverse Effects None known.

13. DISPOSAL CONSIDERATIONS

Waste disposal methods This material, as supplied, is a hazardous waste according to federal regulations (40 CFR 261). It must undergo special treatment, e.g. at suitable disposal site, to comply with local regulations.

US EPA Waste Number D001.

Contaminated Packaging Dispose of in accordance with local regulations.

14. TRANSPORT INFORMATION

DOT

UN/ID no UN 1505
Proper Shipping Name SODIUM PERSULFATE
Hazard class 5.1
Packing Group III

TDG

UN/ID no	UN 1505
Proper Shipping Name	SODIUM PERSULFATE
Hazard class	5.1
Packing Group	III

MEX

UN/ID no	UN 1505
Proper Shipping Name	SODIUM PERSULFATE
Hazard class	5.1
Packing Group	III

ICAO/IATA

UN/ID no	1505
Proper Shipping Name	SODIUM PERSULFATE
Hazard class	5.1
Packing Group	III

IMDG/IMO

UN/ID no	1505
Proper Shipping Name	SODIUM PERSULFATE
Hazard class	5.1
Packing Group	III

ADR/RID

UN/ID no	UN 1505
Proper Shipping Name	SODIUM PERSULFATE
Hazard class	5.1
Packing Group	III

ADN

Proper Shipping Name	SODIUM PERSULFATE
Hazard class	5.1
Packing Group	III

15. REGULATORY INFORMATION

U.S. Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

SARA 311/312 Hazard Categories

This product has the following hazards that are reportable under The Emergency Planning and Community Right-to-Know rule (EPCRA Tier II):

- Oxidizer
- Acute toxicity
- Skin corrosion/irritation
- Serious eye damage/eye irritation
- Respiratory/skin sensitization
- Specific Target Organ Toxicity (STOT) - Single Exposure

Clean Water Act

This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

CERCLA/EPCRA

This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level

pertaining to releases of this material

US State Regulations

U.S. State Right-to-Know Regulations
This product contains the following substances regulated under state Right-to-Know laws:

Chemical name	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Sodium sulfate	X		X		
Sodium Persulfate		X			

California Proposition 65
This product does not contain any Proposition 65 chemicals

CANADA

Environmental Emergencies
This product contains no substances listed under Canada's Environmental Emergency regulations.

Canadian National Pollutant Release Inventory
This product contains no substances reportable under Canada's National Pollutant Release Inventory regulations.

International Inventories

Chemical name	TSCA (United States)	DSL (Canada)	EINECS/ELINCS (Europe)	ENCS (Japan)	China (IECSC)	KECL (Korea)	PICCS (Philippines)	AICS (Australia)	NZIoC (New Zealand)
Sodium sulfate 7757-82-6	X	X	231-820-9	X	X	X	X	X	X
Sodium Persulfate 7775-27-1	X	X	231-892-1	X	X	X	X	X	X

All ingredients are directly listed on the active TSCA Inventory

Mexico

Mexico - Grade Slight risk, Grade 1

16. OTHER INFORMATION

NFPA	**Health Hazards** 1	**Flammability** 0	**Stability** 1	**Special Hazards** OX
HMIS	**Health Hazards** 1	**Flammability** 0	**Physical hazard** 1	**Special precautions** J

NFPA/HMIS Ratings Legend Severe = 4; Serious = 3; Moderate = 2; Slight = 1; Minimal = 0
OX = Oxidizer
Protection=J (Safety goggles, gloves, apron, combination dust and vapor respirator)

Revision date: 2021-10-14
Revision note Manufacturer name changed.

Issuing Date: 2021-10-14

Disclaimer
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Prepared By:

Evonik

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End of Safety Data Sheet

SAFETY DATA SHEET HYDRATED LIME

OSHA Hazard Communication Standard 29 CFR 1910.1200. Prepared to GHS Rev03.

SECTION 1. IDENTIFICATION

Product Name	Hydrated Lime
Chemical Name	Calcium Hydroxide
Synonyms	Chemical Hydrate, Commercial Hydrate, Industrial Hydrate, Hydrate Lime, Hydrate Tailings
Uses	Soil Stabilization, Fixation, Neutralization, Desulphurization, Agriculture, Water Treatment
Distributor	**Mintek Resources** 3725 Pentagon Blvd. Suite 100 Beavercreek, OH 45431 Phone: 937-431-0218
Emergency Contact	**VelocityEHS: (800) 255-3924** (MIS8507735)

SECTION 2. HAZARDS IDENTIFICATION

Classification of the substance or mixture

GHS08 Health Hazard

GHS05 Corrosion

Signal Word	Danger	
Hazard-Determining Components of Labeling	Calcium Oxide, Calcium Carbonate, Calcium Hydroxide	
Hazard Statements	H303	May be harmful if swallowed.
	H335	May cause respiratory irritation.
	H373	May Cause damage to organs (lungs) through repeated or prolonged exposure.
Precautionary Statements	P101	If medical advice is needed, have product container or label at hand.
	P102	Keep out of reach of children.
	P260	Do not breathe dust.
	P264	Wash hands thoroughly after handling.
	P270	Do not eat, drink when using this product.
	P280	Wear protective gloves/protective clothing/eye protection/face protection.
	P284	Wear respiratory protection.
Response	P303	If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse.
	P304	If inhaled: Remove person to fresh air and keep comfortable for breathing.
	P305	If in eyes: Rinse cautiously with water for several minutes

SECTION 3. COMPOSITION

Component	Formula	% Wt.	CAS No.	PEL
Calcium Hydroxide	$Ca(OH)_2$	>90	1305-62-0	5 mg/m^3
Silica-Crystalline Quartz	SiO_2	<1%	14808-60-7	10 mg/m_3 respirable

SECTION 4. FIRST AID MEASURES

Inhalation
Acute: May cause respiratory irritation.
Chronic: Respiratory tract irritation, coughing, burning sensation.

Eyes
Acute: Causes serious eye damage.
Chronic: Pain, watering, redness.

Skin
Acute: Causes skin irritation.
Chronic: Pain or irritation, redness, blistering may occur.

Ingestion
Acute: No known effects.
Chronic: Burning sensation, abdominal cramps and pain, vomiting.

Treatments

Inhalation
Move victim to fresh air. Seek medical attention if necessary. If breathing has stopped, give artificial respiration.

Eyes
Immediately flush eyes with large amounts of water for at least 15 minutes. Pull back the eyelid to make sure all the lime dust has been washed out. Seek medical attention immediately. Do not rub eyes.

Skin
Flush exposed area with large amounts of water. Seek medical attention immediately.

Ingestion
Give large quantities of water or fruit juice. Do not induce vomiting. Seek medical attention immediately. Never give anything by mouth if victim is rapidly losing consciousness or is unconscious or convulsing.

SECTION 5. FIRE FIGHTING MEASURES

Flash Point
Non-flammable

Autoignition Temperature
Non-flammable

Inflammability Limits
None, Non-combustible solid, but will support combustion by liberation of oxygen.

Explosion Risk
None by itself, but heat produced by reaction with strong acids can generate steam and pressure.

Hazardous Combustion Products
Decomposes to produce calcium oxide (CaO), which can react with water to produce steam and pressure.

Extinguishing Media
Use dry chemical fire extinguisher. Do not use water or halogenated compounds, except that large amounts of water may be used to deluge small quantities of lime kiln dust. Use appropriate extinguishing media for surrounding fire conditions.

Fire Fighting Instructions
Keep personnel away from and upwind of fire. Wear full fire-fighting turn-out gear (full Bunker gear), and respiratory protection (self-contained breathing apparatus).

SECTION 6. ACCIDENTAL RELEASE MEASURES

Individual and Collective Precautions	Avoid creating conditions which release dust – use mechanical vacuums to remove dust from workspaces.
Avoid inhalation of Dust	Wear respiratory protection – minimum NIOSH N-95 Dust Mask.
Cleaning Methods (Leaks & Spills)	Use personal protective equipment (eyes, skin, and inhalation, see Section 8). Use dry methods (vacuuming, sweeping) to collect spilled materials. Avoid generating dust. For large spills, evacuate area downwind of clean-up area operations to minimize dust exposure. For small spills, store spilled materials in dry, sealed plastic or metal containers. Dust residue on surfaces may be washed with water.
Precautions for the Protection of the Environment	May not be released into surface waters without controls (increases pH).
Waste Disposal	Dispose according to federal, provincial/state, and local environmental regulations.

SECTION 7. HANDLING & STORAGE

Handling	In open air or in ventilated places, avoid skin and eye contact, avoid creating airborne dust.
Storage	Store in dry places sheltered from humidity. Keep away from acids. Keep out of reach of children.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Limits

	OSHA PEL (mg/m^3)	ACGIH TLV (mg/m^3)	Ont. Reg. 833 TWAEV (mg/m^3)
Calcium Hydroxide	5	2	2
Silica - Crystalline Quartz	2.5 (total dust), 0.8 (respirable)	0.5 (respirable)	0.1

Engineering Controls	Use ventilation and dust collection to control exposure to below applicable limits.

Individual Protection Measures (Personal Protective Equipment):

Respiratory Protection	Wear NIOSH N-95 Dust Mask.
Eye Protection	Eye protection (chemical goggles, safety glasses and/or face shield) should be worn where there is a risk of lime exposure. Contact lenses should not be work when working with lime products.
Hand Protection	Use clean dry gloves.
Skin Protection	Cover body with suitable clothes (long sleeves shirts and trousers). Use over the angle waterproof caustic resistant footwear.

SECTION 9. PHYSICAL & CHEMICAL PROPERTIES

Appearance	Solid, brown/white/tan/gray granular
Odor	Odorless
Odor Threshold	Not Applicable
pH	12.4 graduated solution at 25°C

Melting Point	1076°F (580°C)
Boiling Point	5162°F (2850°C)
Flash Point	Not Applicable
Evaporation Rate	Not Applicable
Flammability	Not Applicable
Upper/Lower Flammability	Not Applicable
Vapor Pressure (+t°)	Non-Volatile
Vapor Density (air=ml)	Non-Volatile
Relative Density	700-900 kg/ m^3
Solubility in Water	0.165g/100g
Partition Coefficient	Not Applicable
Auto-ignition Temperature	Not Applicable
Decomposition Temperature	Not Applicable
Viscosity	Not Applicable

SECTION 10. STABILITY & REACTIVITY

Stability	The product is stable.
Decomposition Temperature	None
Reactivity	No specific test data related to reactivity available for this product.
Conditions to Avoid	Vicinity of incompatible materials.
Incompatibility	• Acids • Reactive Fluoridated • Brominated or Phosphorous Compounds • Aluminum (may form hydrogen gas) • Reactive Powdered Metals • Organic Acid Anhydrides • Nitro-organic Compounds • Interhalogenated Compounds
Hazardous Decomposition Products	None

SECTION 11. TOXICOLOGICAL INFORMATION

Toxicity	This product is not listed by MSA, OSHA, or IARC as a carcinogen, but this product may contain crystalline silica, which has been classified by IARC as (Group 1) carcinogenic to humans when inhaled in the form of quartz or cristobalite. No reported Carcinogenicity, Reproductive Effects, Teratogenicity or Mutagenicity.
Exposure Limits	Refer to Section 8
Irritancy	Can cause severe irritation of eyes, skin, respiratory tract, and gastrointestinal tract.
Chronic Exposure:	Inhalation of silica can cause a chronic lung disorder, silicosis.

SECTION 12. ECOLOGICAL INFORMATION

Alkaline substance that increases pH to 12.4 in a saturated water solution at 25ºC.
Calcium hydroxide gradually reacts with CO_2 in air to form calcium carbonate ($CaCO_3$).
Calcium carbonate is ecologically neutral.
Uncontrolled spillage in surface waters should be avoided since the increase pH could be detrimental to fish.
Harmful to aquatic life in high concentration.

SECTION 13. DISPOSAL CONSIDERATIONS

Dispose according to federal, provincial/state, and local environmental regulations.

SECTION 14. TRANSPORT INFORMATION

Classification

TDG: Not listed for ground transportation.
HMR: Not listed for ground transportation.

TDG: Transportation of Dangerous Goods Regulation (Canada)
HMR: Hazardous Materials Regulation (USA)

SECTION 15. Regulatory Information

Symbol

WHMIS RATING
D2A, E
NFPA RATING
HEALTH-3 SPECIFIC HAZARD – ALK FLASH POINTS-0 REACTIVITY-1
HMIS RATING
HEALTH-2 SPECIFIC HAZARD – ALK FLASH POINTS-0 REACTIVITY-1

SECTION 16. OTHER INFORMATION

Original Prepared	05/13/2013
Revision Date	9/15/2023
Revision #	2

Calciment can be removed from vehicles using rags dampened with dilute vinegar. After applying dilute vinegar, vehicles (especially chrome surfaces) must be washed with water.

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APPENDIX C

Evonik Design Package

KLOZUR® KP

EVONIK
Leading Beyond Chemistry

9-Apr-2026

Customer:	**Langan**	**Prepared by:**	
Contact:	**Pad Krishnaswamy**	**Fayaz Lakhwala PhD**	
Site Location:	**Willets Point, Queens, NY**	**1-908 613-2443**	
Proposal Number:	**OPP 27231**	**Fayaz.Lakhwala@evonik.com**	

Klozur® KP Demand Calculations and Cost Estimate

Item	Packaging Type	Quantity (lbs)	Unit Rate ($USD / lb)	Cost in $USD (FOB Origin)
Klozur® KP	55.1 lb bags	469,452	1.55	$727,651
Klozur® SP	55.1 lb bags	123,424	1.20	$148,109
Klozur Activator(s)				
Hydrated Lime	1625 lb Super Sack	186,875	0.50	$93,438
		Number of Deliveries	**Estimated Cost Per Delivery[4]**	
	Shipping	N/A	N/A	Not Included
	Taxes[3]			Not Included
			Total:	**$969,197**

1) Number of packages needed is rounded up to nearest whole unit.

2) Price valid for 30 days from date at top of document. Terms: net 30 days. Prices are FOB Origin.

3) Any applicable taxes not included. Please provide a copy of your tax exempt certificate or resale tax number when placing your order. In accordance with the law, applicable state and local taxes will be applied at the time of invoicing if Evonik has not been presented with your fully executed tax exemption documentation.

4) If shipping not included, estimated freight rates available upon request. Freight rates provided are estimates only. Standard delivery time can vary from 1-3 weeks from time of order, depending upon volume. Expedited transport can be arranged at extra cost.

5) Return Policy: Within 60 days of sale and following written approval by Evonik, products in their unopened containers, which by analysis meet the original specifications and are in the same condition as they were shipped, will be accepted for return at invoiced price, less a 25% handling charge and return freight paid by buyer. Products that are made to order or custom blended are non-returnable. Returned products that are not received back by Evonik in the same condition as they were shipped or that have been stored outside, may be subject to a higher restocking fees or no refund at all.

6) All sales are per Evonik's Terms and Conditions.

7) All disclaimers within the standard proposal/demand calculator attachments apply to any and all estimates.

PROPOSAL ATTACHMENTS

PRODUCT OVERVIEW

Klozur® KP is an environmental grade potassium persulfate which will persist for an extended period of time when dosed above its solubility limit. Like other Klozur® persulfates, Klozur® KP has been delivered safely and cost effectively to treat a wide variety of common contaminants of concern with an unmatched combination of power and control. With proper activation, Klozur® KP can generate oxidative, and reductive pathways delivering the power to destroy the most recalcitrant of contaminants.

For more information on activated Klozur® KP, please contact your Evonik representative or www.klozur.com.

SITE INFORMATION

Application Type — **Source Zone Treatment**

	Value	Unit	Note
Length (Perpendicular to GW Flow)	190	ft	customer supplied
Width (Parallel to GW Flow)	193	ft	customer supplied
Area of Treatment	36,700	ft2	customer supplied
Top of Target Interval	6	ft bgs	
Bottom of Target Interval	16	ft bgs	
Treatment Zone Thickness	10	ft	customer supplied
Treatment Volume	367,000	ft3	calculated value
Porosity	40	%	customer supplied
Effective Porosity	20	%	customer supplied
Ground Water Volume	1,097,994	USG	calculated value
Aquifer Temperature	18	◦C	customer supplied
Linear groundwater flow velocity	131	ft/year	calculated value
Groundwater Flowrate	49,932	ft3/year	calculated value
Soil Oxidant Demand	13	g Klozur / kg soil	estimated value, it is recommend that this be analytically determined
Soil Base Buffering Capacity (Alkaline Activation only)	0.5	g 25 percent NaOH / kg soil	estimated value, it is recommend that this be analytically determined
GW Base Buffering Capacity (Alkaline Activation only)	0.1	g 25 percent NaOH / L Groundwater	estimated value, it is recommend that this be analytically determined

Disclaimer:
The estimated dosage and recommended application methodology described in this document are based on the site information provided to Evonik, but are not meant to constitute a guaranty of performance or a predictor of the speed at which a given site is remediated. Klozur® persulfate and activator demand calculations do not take into account the kinetics, speed of the reaction, or ability to establish contact between the reagents and contamination in the subsurface. These calculations represent the minimum anticipated amount needed to treat the contaminants of concern (COCs). As a result, these calculations should be used as a general approximation for purposes of an initial economic assessment. Evonik recommends that oxidant demand and treatability testing be performed to verify the quantities of oxidant needed.

CONTAMINANTS OF CONCERN* (COCs)

Concentrations:

The following are estimates of the contaminant concentration in groundwater within the target area. The total COC mass was calculated including estimated COC mass in groundwater, soil and NAPL, if present, within the targeted area.

Contaminant	GW (mg/L)	Soil (mg/kg)	NAPL (lb)	Total COC Mass** (lb)
trimethylbenzene	0.1	24.0	0.0	793.6
BTEX	0.55	0.5	0.0	21.6
MTBE	0.5	0.1	0.0	8.5
naphthalene	0.1	36.0	0.0	1190.0
phenol	0.03	2.0	0.0	66.3
methylnaphthalene	0.023	16.0	0.0	528.7
benzo(a)anthracene	0.007	3.1	0.0	103.4
fluoranthene	0.01	3.2	0.0	104.5

Remedial Goals and Target Mass Reductions:

The target demand is determined by also accounting for remedial goals for each contaminant and represents the estimated mass reductions targeted for each contaminant.

Contaminant	GW (mg/L)	Soil (mg/kg)	NAPL (mg/L)	Total COC Mass (lb)
trimethylbenzene	0	0.0	0.0	793.6
BTEX	0	0.0	0.0	21.6
MTBE	0	0.0	0.0	8.5
naphthalene	0	0.0	0.0	1190.0
phenol	0	0.0	0.0	66.3
methylnaphthalene	0	0.0	0.0	528.7
benzo(a)anthracene	0	0.0	0.0	103.4
fluoranthene	0	0.0	0.0	104.5

*Unless provided, sorbed concentrations were roughly estimated based on expected groundwater concentrations, foc and Koc values. For a more refined estimate, it is recommended that actual values be verified via direct sampling of the targeted treatment interval.

** Includes estimated contaminant mass in soil, groundwater, and NAPL (if provided) at the site.

*** Includes estimated contaminant mass in soil, groundwater, and NAPL (if provided) at the site with the remedial goals subtracted from the total mass onsite.

Contaminant	GW (mg/L)	Contaminant Flux (lbs/yr)	Total COC Mass* (lbs)
trimethylbenzene	0.1	0.31	0.31
BTEX	0.6	1.71	1.71
MTBE	0.5	1.56	1.56
naphthalene	0.1	0.31	0.31
phenol	0.03	0.09	0.09
methylnaphthalene	0.023	0.07	0.07
fluoranthene	0	0.02	0.02

*Estimated mass flux of contaminants into Permeable Reactive Barrier over potential life of barrier.

GEOCHEMICAL DATA

Influent Oxidant Demand	GW (mg/L)	GW (kg/yr)	Total (kgs)	
Chemical Oxidant Demand	50	20.8	0.0	customer provided
ORP (mV)	NA	mV		
pH	NA			

KLOZUR® PERSULFATE DEMAND

The estimated mass of Klozur® KP accounts for target demand with the COCs, non-target demand associated with influent groundwater, maintaining the theoretical solubility of Klozur® KP in the influent groundwater and a safety factor applied to each. The safety factor is intended to account for potential variability and any other uncertainties associated with the application or site.

The demand from COCs was estimated using: **Degradation Ratio**

The degradation ratio should be determined/verified in a bench or field test

	Total Klozur KP
Klozur® KP Demand	**469,452 lb**

	Total Klozur SP
Klozur® SP Demand	**123,424 lb**

KLOZUR® PERSULFATE PACKAGING OPTIONS AND PRICING

Klozur® KP can be delivered to your site in in bags or super sacks for your handling convenience. Pricing below is exclusive of shipping and any applicable taxes.

Klozur® KP

Packaging Type	Packages / pallet	Number of Pallets	Number of Packages
55.1 lb bags	40	213	8,520

Available Packaging Types	Unit Rate ($USD / lb)	Quantity (lbs)	Cost in USD (FOB Origin)
55.1 lb bags	1.55	469,452	$727,651

Klozur® SP

Packaging Type	Packages / pallet	Number of Pallets	Number of Packages
55.1 lb bags	40	56	2,240

Available Packaging Types	Unit Rate ($USD / lb)	Quantity (lbs)	Cost in USD (FOB Origin)
55.1 lb bags	1.20	123,424	$148,109

KLOZUR® ACTIVATION CHEMISTRIES

Klozur® activation chemistries are used to convert Klozur® KP into the highly reactive radicals. Choosing the right activator chemistry for your contaminants of concern is important in obtaining a successful site remediation. The choice of activator will be dependent upon the target contaminants, site lithology and hydrogeology, and other site conditions. While activator demand quantities for all methods are given, not all activation methods are recommended for your given contaminant or site conditions. Please consult with an Evonik technical representative for proper selection of activation chemistry.

Note: Only one type of activator is typically needed.

***Evonik Industries, AG is the owner or licensee under various patent applications relating to the use of activation chemistries**

Hydrated Lime [$Ca(OH)_2$]

Hydrated lime can be used to create alkaline conditions used to activate Klozur KP. The calculations assume a 1:1 molar ratio of hydrated lime to Klozur® KP plus influent groundwater base buffer capacity.

INSTALLATION VIA INJECTION

Klozur® KP will be delivered as a dry powder, packaged in 55.1 lb (25 Kg) bags or 2,204 lb (1,000 Kg) supersacks and in 1,102 lb (500 Kg) supersacks by special order. Klozur® KP has a limited soluble in water ranging from 17 g/L (0°C) to 47 g/L (20°C). When applied at greater than its theoretical solubility, Klozur® KP solid will persist and slowly dissolve maintaining the theortical solubility in solution. Klozur® KP is typically applied as a solid/slurry via direct push points or soil mixing. Klozur® KP is often applied as a dense solid state slurry, typically between 40 and 50 percent solids by weight although some have applied at even higher concentrations.

Klozur® KP is typically applied as a solid slurry. It can be injected combined with Klozur® SP. Klozur® pesulfates are activated. Extended release Klozur® KP is usually combined with extended release alkaline source hydrated lime. Although other activators can be used. Specific activators such as hydrated lime and PermeOx® Ultra can be combined with Klozur® KP and injected as a single slurry. However, other activators, such as zero valent iron, must be applied in a separate slurry.

Injected Reagents

Solid Reagents			Highly Soluble Reagents		
Klozur® KP	lb	469,452	Klozur® SP	lb	123,424
Hydrated Lime	lb	186,875			
		656,327			123,424

Oxidants and Activators Injected in: Single Slurry

Slurry Preparation

	Units	Klozur® KP Slurry
Total Solid Reagents	lb	656,327
Total Dissolvable Reagents	lb	123,424
Solids/Slurry Concentration	%	**50**
Added Water Weight	lb	532,903
Volume of Water to be added	gal	63,974
Estimated Total Injection Volume	gal	102,271

Conventional Slurry Emplacement (DPT or Similar)

	Units	Klozur® KP Slurry
Solid Mass per unit length	lbs per linear ft	179
Number of Injection Points		367
Injection Point Spacing	ft	10.0
Injection Volume per point	gal	279
Injection Volume per unit length	gal/ft	28
Mass Per Injection Point	lbs	2,125
Klozur® KP	lbs	1,279
Klozur® SP	lbs	336
Hydrated Lime	lbs	509

APPENDIX D

Construction Health and Safety

CONSTRUCTION HEALTH AND SAFETY PLAN

FOR

WILLETS POINT DEVELOPMENT
L-PARCEL BCP SITE
BCP Site No. C241146H
126th STREET/WILLETS POINT BOULEVARD
QUEENS, NEW YORK
Queens Borough Tax Map
Block 1833, Lots 158 and 172

Prepared for

Queens Development Group, LLC
30 Hudson Yards
New York, NY 10001

Prepared by:

Langan Engineering, Environmental, Surveying
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LANGAN

October 2023
Langan Project No. 170197605

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1.0 INTRODUCTION

1.1 General

This Construction Health And Safety Plan (CHASP) was developed to address disturbance of known and reasonably anticipated subsurface contaminants and comply with Occupational Safety and Health Administration (OSHA) Standard 29 Code of Federal Regulation (CFR) 1910.120(b)(4), Hazardous Waste Operations and Emergency Response during anticipated site for the property known as the Willets Point Development L Parcel BCP Site No. C241146H and located at Seaver Way (formerly 126th Street) and Willets Point Boulevard in Queens, New York (hereinafter referred to as the site). The Site is part of a larger property known as Willets Point, which was accepted into the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) in 2013. The Willets Point BCP site was assigned BCP Site No. C241146. Per a January 16, 2018, letter from the New York State Department of Environmental Conservation (NYSDEC), the Willets Point BCP site was divided into two operable units (OU-1 and OU-2) to facilitate near term affordable housing development on OU-1. OU-1, also known as Phase 1A, is about 7.803 -acres in area. This CHASP supports activities proposed for the Site identified on the Queens Borough Tax Map as Block 1833, Lots 158 and 172.

This CHASP provides the minimum requirements for implementing site operations during future remedial measures. All contractors performing work on this site must implement their own CHASP that, at a minimum, adheres to this CHASP. The contractor is responsible for their own health and safety and that of their subcontractors. Langan personnel will implement this CHASP while onsite.

The content of this CHASP may change or undergo revision based upon additional information made available to health and safety personnel, monitoring results, or changes in the work plan.

1.2 Site Location and Background

The Willets Point site is located at in and around 126th Street/Willets Point Boulevard and comprises 56 tax lots within 8 city blocks and has a total area of about 23.5 acres. A site location map is enclosed as Figure 1. The Willets Point BCP site, including OU-1 and OU-2, comprises mostly vacant land. Citi Field and various industrial- and commercial-use properties are adjacent to the Willets Point BCP site.

Prior to the 1900s, the Willets Point area was a tidally influenced saltwater meadow. From the early 1900s to the early 1930s, the area was used as a dumping ground for coal ash from residential and municipal heating operations in greater New York City. In the late 1930s, Willets

Point along with nearby Flushing Corona Park were graded and redeveloped. Previously deposited coal ash was left in place as fill material. Willets Point was developed primarily with automotive uses, including small car repair shops, filling stations, and scrapyards. These automotive-centric industrial activities characterized Willets Point through about 2015 when most of the former one- and two-story industrial buildings at the site were demolished. All structures were demolished as of spring 2019.

1.3 Summary of Work Tasks

1.3.1 Geophysical Investigation

Prior to the commencement of intrusive field activities (i.e., soil borings); a geophysical consultant may conduct a geophysical survey using ground penetrating radar (GPR) and electromagnetic detection equipment. Langan personnel will coordinate the geophysical survey. The objective of the survey will be to identify any underground storage tank (UST) structures, drains, underground utilities, and other subsurface anomalies that may be encountered during the investigation. During this time Langan personnel will inspect the site and confirm sample locations.

1.3.2 Hand Clearing of Borehole Locations

If there is no geophysical survey for utility clearance or the results of the geophysical survey are inconclusive at specific locations subject to intrusive work, the contractor may hand clear each location to confirm utilities or other known or suspected subsurface structures. Hand clearing of a soil boring location should extend to a depth of 5 feet and be about 1.5 times the anticipated diameter of the borehole when drilled. Langan personnel will confirm that hand clearing activities are completed to these specifications.

1.3.3 Day Lighting Excavation and Soil Screening

Langan may retain an excavation contractor to daylight buried unidentified structures. The purpose of the daylighting is to confirm if these structures are subsurface structures of concern (underground storage tanks [USTs], utilities (sewer lines, storm water drains, electrical, gas or other utility line as well as other artifacts pertinent to the work plan). The excavation contractor will contact the appropriate utility mark-out authority and make available to their staff the verification number and effective dates.

Pursuant to these activities, Langan will screen excavated soil for visual, olfactory, and instrumental indicators suggestive of a potential chemical or petroleum release. Instrument screening for the presence of VOCs may be performed with a duly calibrated photoionization

detector (PID). Contractors will notify Langan personnel if they identify indications suggestive of a potential chemical or petroleum release. Contaminated material shall be handled, and property disposed in accordance with federal, state and city regulations, criteria, and guidelines.

1.3.4 Waste Characterization - Soil Investigation and Sampling

Langan may undertake a waste characterization investigation in accordance with the work plan. Langan may retain a drilling contractor to complete to advancing soil borings to a depth below grade surface (bgs) as specified in the work plan. If advanced, borings will be installed at the approximate locations indicated in Langan's work plan but may be moved in the field based on utility clearance and accessibility. The drilling contractor will contact the appropriate utility mark-out authority and make available to their drilling staff the verification number and effective dates. Langan will record the verification number and effective dates from the drillers. Langan will also note the location of marked out utilities on the site plan and scan the data into the project folder.

Langan personnel will screen soil for visual, olfactory, and instrumental indicators suggestive of a potential petroleum release. Instrument screening for the presence volatile organic compounds (VOC) may be performed with a duly field-calibrated photoionization detector (PID) (or equivalent). Langan personnel will collect soil samples from following the waste classification sampling plan outlined in the work plan. If advanced, borings will be filled with clean soil cuttings, clean sand or bentonite grout and capped at grade to match the surrounding surface after samples are collected.

Soil samples will be submitted to a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP)-certified laboratory and analyzed in accordance with work plan specifications.

1.3.5 Decommissioning and Removal of Underground Storage Tank

If an underground storage tank (UST) is encountered, a UST decommissioning and removal contractor shall furnish all labor and materials, equipment and incidentals required for the proper decontamination, removal, and closure of any UST in accordance with federal, state, and local regulations. Langan personnel will monitor VOCs with a calibrated PID downwind from the UST excavation and record the PID readings.

1.3.6 Excavation and Soil Screening

Langan field personnel will document excavation. Pursuant to these activities, Langan will screen excavated soil for visual, olfactory, and instrumental indicators suggestive of a potential chemical or petroleum release. Instrument screening for the presence of VOCs may be performed with a

duly calibrated PID. Langan will observe contractors excavating for utilities, foundation components, and potential grading using heavy equipment and hand tools. Contractors will notify Langan personnel if they identify indications suggestive of a potential chemical or petroleum release. Contaminated material shall be handled, and properly disposed of in accordance with federal, state, and city regulations, criteria, and guidelines.

1.3.7 Soil Sampling

As part of the excavation activities, soil samples (waste characterization, excavation endpoint, delineation, or quality assurance/quality control [QA/QC]) may be collected during construction, as required. Langan personnel will coordinate with the contractor in sampling soil (in accordance with the work plan, where applicable).

Soil samples, including excavation endpoint or delineation samples (along with QA/QC samples), may be collected, and subsequently submitted to a NYSDOH ELAP-certified laboratory and analyzed in accordance with work plan specifications.

1.3.8 Stockpiling

Potentially impacted soil may be stockpiled pending laboratory analysis and determining proper off-site disposal. Visibly contaminated soil, if encountered, shall be segregated and stockpiled on at least 10-mil (1/1000th of an inch) plastic sheeting; reusable soil and fill shall be segregated and stockpiled separately from unusable fill, concrete and other debris; the stockpiles shall be kept covered with 6-mil-thick plastic sheeting; the plastic sheeting covering the stockpiles shall be anchored firmly in place by weights, stakes, or both; the Contractor shall maintain the plastic sheeting.

1.3.9 Characterization of Excavated Material

When required by the work plan, Langan personnel will characterize excavated soil or clean backfill in accordance with Langan standards.

1.3.10 Excavation Backfill

Areas of the site that were over-excavated may be backfilled to development grade (i.e., the grade required to complete construction of the foundation and sidewalk extension). Imported material should meet specifications defined in the work plan or consist of clean fill that meets the 6 New York Codes, Rules, and Regulations (NYCRR) Part 375-6.8(a) Unrestricted Use Soil Cleanup Objectives (UU SCOs) or other acceptable fill material such as virgin stone from a permitted mine or quarry or recycled concrete aggregate (RCA).

1.3.11 Groundwater Investigation and Sampling

Groundwater samples may be collected from one or more of the new and if available, pre-existing monitoring or recovery wells in accordance with the Langan Low Flow Groundwater Sampling SOP (SOP #12). Groundwater samples will be submitted to an approved laboratory and analyzed for constituents as specified in the work plan.

Groundwater samples will be submitted to a NYSDOH ELAP-certified laboratory and analyzed in accordance with work plan specifications.

1.3.12 Groundwater/Product Gauging

Langan may gauge one or more of the observation/monitoring wells to collect synoptic head data or determine the presence of product. When gauging, Langan may also survey head space VOCs within the well using a duly calibrated PID. When collected, gauging data will be based on the northernmost point at top of casing (TOC) using an interface probe (IP) capable of determining the presence of free product in the monitoring well as light non-aqueous phase liquid (LNAPL) at the top of the water column. If gauging for dense non-aqueous phase liquid (DNAPL) at the base of the monitoring well, the IP may not be appropriate. The field engineer will coordinate with the project team to devise an alternative method to gauge the thickness of DNAPL at base of the well. Langan will decontaminate gauging equipment between wells as required by the work plan.

1.3.13 Product Bailing

Langan may remove free product from on-site monitoring wells as part of this CHASP or subsequent Site Management (SMP) activities. Langan will may use a bailer, peristaltic pump or submersible as determined by the work plan. Langan will record the volume of product and groundwater recovered. Recovered product and groundwater will be drummed in accordance with procedures outlined in the work plan.

1.3.14 Construction Dewatering

Construction dewatering, while not specific to the work plan, may be initiated if needed. If initiated, the dewatering contractor shall be responsible for handling contaminated dewatering fluids in accordance with federal, state, and local regulations. Dewatering fluids are likely to be discharged to the local sanitary sewer system after treatment and under an approved regulatory permit. Alternatively, the contractor may provide containerized storage to allow for testing of groundwater prior to, and after, treatment and before disposal. If required, Langan field personnel may sample dewatering treatment system liquids from either a discharge standpipe or a storage

tank. Dewatering samples will be submitted to an ELAP-certified laboratory for analysis.

1.3.15 Construction Activity Inspections and Observations

Langan will observe construction activities including the general oversight, observation of landscaping activities, and other select observation, project management, and supervision as specified in the work plan or in accordance with the construction documents, or special inspection requirements administered by the New York City Department of Buildings. Materials used for construction will be inspected by Langan for conformance to the design documents.

1.3.16 Observation/Monitoring Well Plugging and Abandonment

At an unspecified future date, the observation/monitoring wells will be abandoned. Plugging and abandonment will be in accordance with federal and state requirements. Langan may retain a drilling contractor to complete the plugging and abandonment activities. The contractor will contact the appropriate utility mark-out authority and make available to their field staff the verification number and effective dates. Langan may observe the plugging and abandonment of one or more observation/monitoring wells to document that the plugging and abandonment activities were completed in accordance with the work plan and regulations.

1.3.17 QA/QC Sampling

Samples for quality assurance/quality control [QA/QC] may also be collected and submitted to an approved laboratory and analyzed in accordance with work plan specifications. Information regarding the QA/QC samples including required method of analysis may be included in the same COC as the soil samples unless otherwise instructed by the work plan.

1.3.18 Storm water Pollution Prevention Inspection

If required and in accordance with the SMP, Langan personnel with Storm Water Pollution Prevention (SWPPP) inspection credentials will conduct SWPPP inspections. Langan will observe the stormwater pollution prevention system install to document that the install is in accordance with the work plan and respond appropriately if impacted soil is observed during excavation.

1.3.19 Equipment Decontamination

Before the start of the day's sampling and after sampling each run, sampling equipment will be decontaminated by the decontamination process outlined Attachment B - Decontamination Procedures. Decontamination wastes and purge water will be temporarily stored on site pending

analytical results.

1.3.20 Management of Investigative-Derived Waste

The investigative-derived waste (IDW) generated during this investigation will be contained in DOT-approved 55-gallon drums. The drums will be temporarily stored on the site or as directed by the client representative. All drums will be filled between to two-thirds full to allow easy maneuvering during drum pickup and disposal. Drum labels are to be provided by Langan (Environmental Closet). All drums will be labeled as "IDW Pending Analysis" until sample data are reported from the laboratory. Drum labels will include date filled and locations where waste was generated along with the standard information required by the labels in accordance with the Langan SOP09, Drum Labeling.

Closed top drums are to be used to store liquids. Debris, including plastic sheeting, polyethylene tubing, personal protection equipment (PPE), decontamination debris, etc. will be segregated from and disposed in large heavy duty garbage bags and disposed of at the site. Excess unused glassware should be returned to the lab along with the last day of collection samples.

1.3.21 Drum Sampling

Langan personnel may collect drum samples, as required, prior to off-site drum disposal. Samples will be placed into laboratory-supplied batch-certified clean glassware and submitted to an approved laboratory and analyzed in accordance with work plan specifications, if required.

1.3.22 Surveying

Surveying activities may be completed by Langan. Surveying will be conducted by licensed surveyors.

2.0 IDENTIFICATION OF KEY PERSONNEL/HEALTH AND SAFETY PERSONNEL

The following briefly describes the health and safety (H&S) designations and general responsibilities that may be employed for this site. The titles have been established to accommodate the project needs and requirements and ensure the safe conduct of site activities. The H&S personnel requirements for a given work location are based on the proposed site activities.

2.1 Langan Project Manager

The Langan Environmental Project Manager (PM) Elizabeth Burgess, the Langan Geotechnical

PM is Vijayakrishnan Veluchamy, and the Langan Site Civil PM is Matthew Read; their responsibilities include:

- Ensuring that this CHASP is developed, current, and approved prior to on-site activities.
- Ensuring that the tasks in the project are performed in a manner consistent with Langan's comprehensive *Health and Safety Program for Hazardous Waste Operations* and this CHASP.

2.2 Langan Corporate Health and Safety Manager

The Langan Corporate Health and Safety Manager is Tony Moffa. His responsibilities include:

- Updating the *Construction Health and Safety Program for Hazardous Waste Operations*.
- Assisting the site Health and Safety Officer (HSO) with the development of the CHASP, updating CHASP as dictated by changing conditions, job site inspection results, etc., and approving changes to this CHASP.
- Assisting the HSO in the implementation of this CHASP and conducting Jobsite Safety Inspections and assisting with communication of results and correction of shortcomings found.
- Maintaining records on personnel (medical evaluation results, training and certifications, accident investigation results, etc.).

2.3 Langan Site Health & Safety Officer

The Langan site HSO is William Bohrer. His responsibilities include:

- Participating in the development and implementation of this CHASP.
- When on-site, assisting the Langan Field Team Leader in conducting Tailgate Safety Meetings and Jobsite Safety Inspections and correcting any shortcomings in a timely manner.
- Ensuring that proper PPE is available, worn by employees, and properly stored and maintained.
- Controlling entry into and exit from the site contaminated areas or zones.
- Monitoring employees for signs of stress, such as heat stress, fatigue, and cold exposure.
- Monitoring site hazards and conditions.
- Knowing (and ensuring that all site personnel also know) emergency procedures, evacuation routes, and the telephone numbers of the ambulance, local hospital, poison control center, fire department, and police department.
- Resolving conflicts that may arise concerning safety requirements and working

conditions.

- Reporting all incidents, injuries, and near misses to the Langan Incident/Injury Hotline immediately and the client representative.

2.4 Langan Field Team Leader Responsibilities

The Langan Field Team Leader (FTL) is to be determined prior to the start of field activities. The Field Team Leader's responsibilities include:

- The management of the day-to-day site activities and implementation of this CHASP in the field.
- Participating in and/or conducting Tailgate Safety Meetings and Jobsite Safety Inspections and correcting any shortcomings in a timely manner.
- When a Community Air Monitoring Operating Program (CAMP) is part of the scope, the FTL will set up and maintain community air monitoring activities and instruct the responsible contractor to implement organic vapor or dust mitigation when necessary.
- Overseeing the implementation of activities specified in the IRMWP.

2.5 Contractor Responsibilities

The contractor must develop and implement their own CHASP for their employees, their subcontractors, and consultants. The contractor is responsible for their own health and safety and that of their subcontractors. Contractors operating on the site must designate their own FTL, HSO, and Health and Safety Manager (HSM). The contractor's CHASP will be at least as stringent as this CHASP. The contractor must be familiar with and abide by the requirements outlined in their own CHASP. A contractor may elect to adopt Langan's CHASP as its own provided that it has given written notification to Langan, but where Langan's CHASP excludes provisions pertinent to the contractor's work (i.e., confined space entry); the contractor must provide written addendums to this CHASP. Additionally, the contractor must:

- Ensure their employees are trained in the use of all appropriate PPE for the tasks involved.
- Notify Langan of any hazardous material brought onto the job site or site-related area, the hazards associated with the material, and must provide a material safety data sheet (MSDS) or safety data sheet (SDS) for the material.
- Have knowledge of, understand, and abide by all current federal, state, and local health and safety regulations pertaining to the work.
- Ensure their employees handling hazardous materials, if identified at the Site, have received current training in the appropriate levels of 29 CFR 1910.120, *Hazardous Waste Operations and Emergency Response* (HAZWOPER) if hazardous waste is identified at the Site.

- Ensure their employees handling hazardous materials, if identified at the Site, have been fit-tested within the year on the type of respirator they will wear; and
- Ensure all air monitoring is in place pertaining to the health and safety of their employees as required by OSHA 1910.120; and
- All contractors must adhere to all federal, state, and local regulatory requirements.

3.0 TASK/OPERATION SAFETY AND HEALTH RISK ANALYSES

A Task-Hazard Analysis (Table 1) was completed for general construction hazards that may be encountered at the Site. The potential contaminants that might be encountered during the field activities and the exposure limits are listed in Table 2 complete inventory of MSDS/SDS for chemical products used on site is included in Attachment E.

3.1 Specific Task Safety Analysis

3.1.1 Geophysical Survey

Langan personnel are not permitted to operate or otherwise handle the geophysical equipment including any downhole geophysical equipment subsequently used to survey boreholes. When boring locations are surveyed with surface geophysical equipment, the locations of the borings as well as utilities and other artifacts that may interfere with the subsurface investigation are to be marked with indelible paint, flags, or color tape (when marking indoor locations that the client has specifically requested not be marked with indelible paint). This information must also be added to the site map. When applying paint, proper PPE including hand protection should be used.

3.1.2 Hand Clearing of Borehole Locations

Hand clearing will be completed by the contractor. Langan personnel are not permitted to operate or otherwise handle the contractor equipment. Langan will update the site map to include the locations of the cleared borehole locations as well as utilities and other artifacts that may interfere with the subsurface investigation.

3.1.3 Daylighting Test Pit

Excavation daylighting must abide by OSHA excavation standards (Part 1926.651). Daily inspections of excavations, the adjacent areas, and protective systems shall be made by a competent person for evidence of a situation that could result in cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection shall be conducted by the competent person prior to the start of work and as needed throughout

the shift. Inspections shall also be made after every rainstorm or other hazard increasing occurrence. Sampling the soil requires the donning of chemical resistant gloves in addition to the standard PPE. Langan personnel are not to operate excavation equipment. This task is to be completed by the excavation contractor.

3.1.4 Waste Characterization – Soil Investigation and Sampling

Sampling the soil requires the donning of chemical resistant gloves in addition to the standard PPE. Langan personnel are not to operate drilling or excavation equipment nor open sampling devices (acetate liners, sonic sample bags, etc.). These tasks are to be completed by the driller or excavation contractor.

3.1.5 Indoor Drilling and Excavation

The work scope may require indoor excavation where there may not be adequate ventilation sufficient to safely operate any rig or excavation equipment powered by an internal combustion engine. Where possible, all such work should be done by equipment powered by electricity. If such equipment is used and must be directly wired to the buildings electrical system or to an independent system, this work must be completed by a licensed electrician in accordance with all electrical codes applicable to the work.

Indoor work which is to be completed with equipment powered by an internal combustion engine must incorporate air monitoring of carbon monoxide (CO) using calibrated air monitoring equipment (MultiRAE or equivalent). In addition, the work plan should incorporate mitigation for venting engine exhaust fumes directly to the outdoors and for circulating fresh air into the work area.

The OSHA Time Weighted Average (TWA) Permissible Exposure Limit (PEL) for CO from 50 to 35 parts per million (ppm). Langan will monitor CO with a suitable monitoring device. If CO levels exceed 5 ppm, Langan will instruct contractors to begin mitigation measures. These measures are at a minimum:

- Increase air circulation using industrial size fans to bring additional fresh air into the building or vent exhaust to the outside.
- Modify the passive exhaust method being used to increase venting circulation by using wider diameter tubing or sealing tubing connections; or
- Modify the work schedule where the rig is turned off to allow time for CO levels to fall back to background.

All work must cease if CO levels reach 35 ppm. The Langan engineer is to report to the PM and

H&S officer when an action level is reached.

3.1.6 Excavation and Soil Screening

Langan personnel will observe excavation and SOE activities including the general oversight, observation of landscaping activities, and other select observation, project management, and supervision as specified in the work plan or in accordance with the construction documents, or special inspection requirements administered by the New York City Department of Buildings. Materials used for construction may be inspected by Langan personnel for conformance to the design documents. Prior to entering excavation, Langan personnel will ensure that excavation shoring conforms to proper shoring/benching/sloping techniques, at a minimum that soil and equipment is kept at least 2 feet from the edge of the excavation, that there is no water in the excavation, and that a competent person has inspected excavation prior to allow persons to enter. When entering excavation via a ladder, Langan personnel will only use ladders that are properly situated in accordance with the Ladder section of the CHASP.

Sampling the soil requires the donning of chemical resistant gloves in addition to the standard PPE. Langan personnel are not to operate nor direct the use of excavation equipment. These tasks are to be completed by the excavation contractor.

3.1.7 Soil Screening and Sampling

Sampling soil requires the donning of chemical resistant gloves in addition to the standard PPE. Langan personnel are not to operate drilling or excavation equipment, nor open sampling devices (acetate liners, sonic sample bags, etc.). These tasks are to be completed by the driller or excavation contractor.

3.1.8 Stockpile Sampling

Langan personnel are not to scale or otherwise climb stockpiles. If the soil sampling plan requires sampling from the stockpile above ground level, samples are to be obtained using suitable excavation equipment operated by the contractor (i.e., front end loader).

3.1.9 Removal of Underground Storage Tank

If UST excavation and removal activity is initiated, Langan personnel will conduct air monitoring for lower explosion limit (LEL) conditions within the UST excavation itself. This task is to be performed using calibrated air monitoring equipment designed to sound an audible alarm when atmospheric concentrations of VOCs are within 10% of the LEL. In normal atmospheric oxygen concentrations, the LEL monitoring may be done with a Wheatstone bridge/catalytic bead type

sensor (i.e., MultiRAE). However, in oxygen depleted atmospheres (confined space), only an LEL designed to work in low oxygen environments may be used. Best practices require that the LEL monitoring unit be equipped with a long sniffer tube to allow the LEL unit to remain outside the UST excavation. Langan personnel are not to enter the UST excavation nor enter an excavated UST.

In addition to monitoring LEL, Langan personnel will monitor atmospheric VOC concentrations directly downwind of the UST excavation in accordance with standard CAMP procedures using calibrated air monitoring equipment.

3.1.10 Backfilling of Excavated Areas to Development Grade

The backfilling contractor will provide their employees with equivalent PPE to protect them from the specific hazards likely to be encountered on-site. Selection of the appropriate PPE must take into consideration: (1) identification of the hazards or suspected hazards; (2) potential exposure routes; and (3) the performance of the PPE construction (materials and seams) in providing a barrier to these hazards. Langan personnel may survey backfilling material with a calibrated PID; however, as they are not permitted to climb the material delivery truck, the contractor must provide samples from each truck as required.

3.1.11 Groundwater Investigation and Sampling

Sampling groundwater requires the donning of chemical resistant gloves in addition to the standard PPE and cut resistant gloves when cutting sampling-tubing to length.

3.1.12 Groundwater/Product Gauging

Gauging product requires additional safety considerations including the presence of VOCs and protection of both field cloths and property. Langan will monitor air for VOCs using a duly calibrated PID. Langan will don protective clothing including Tyvek® over-clothes, as necessary. To protect property, Langan will work set a plastic barrier to protect floors or protect landscaping and use absorbent pads as necessary to collect pooled product. If sampling for PFAS from the same well, Langan will complete the product check first, if the well can be sampled without including product, Langan will remove the Tyvek® material from the well head vicinity.

3.1.13 Electrical Pumps

Langan may use an electric pump to collect product from the recovery/monitoring wells or to sample groundwater. Langan will inspect the electric pump and control box prior to use and

specifically note the condition of the electrical connectors, pump, control box and the electrical cord. The electrical connection must be grounded and connect to the power source using a functional three prong grounded plug. The power source must be a Ground Fault Circuit Interrupter (GFI or GFCI) receptacle.

3.1.14 Storm water Pollution Prevention Inspection

When performing SWPPP inspections, Langan personnel will don all required PPE and maintain awareness to site traffic and site activities. If using a cell phone or tablet application to record the pertinent data, the engineer will do so in an area protected from site traffic and activities. Certain types of inspections may require additional PPE and safety training including fall protection and open water hazards.

3.1.15 Construction Dewatering

If required, Langan may sample dewatering treatment system liquids from either the direct discharge standpipe or from a sample port or valve built into the storage tank, Langan will don the necessary PPE including nitrile gloves and if necessary, facial splash guard. Sample ports and valves may only be sampled if they are accessible at ground level. Sampling from heights over 6 feet is prohibited unless Langan field personnel are fully accredited in fall protection and is wearing approved fall protection safety apparatus. The discharge samples will be submitted to an ELAP-certified laboratory for analysis in accordance with the work plan.

3.1.16 Plugging and Abandonment of Observation/Monitoring Wells

Langan personnel are not to operate equipment nor assist in the plugging and abandonment of the observation/monitoring wells. These tasks are to be completed by the contractor.

3.1.17 Support of Excavation

Langan personnel will inspect elements of the SOE including tiebacks in accordance with specification in the work plan and record the data the work plan and/or contract documents require. The installation of the soil pilings, tiebacks and other SOE activities are to be done exclusively by the contractor following their own health and safety specifications outlined in their CHASPs. Other activities assigned to Langan as part of the SOE are limited to inspection and observations as specified in the work plan and/or contract documents. Langan personnel are not to operate or assist in the operation of equipment used in the SOE unless defined as part of an inspection or observation in the work plan and/or contract documents.

3.1.18 Construction Activity Inspection

The contractor will operate equipment used during site construction. Langan personnel will observe construction activities in accordance with specification in the work plan and record the data the work plan requires. Construction activities are to be done exclusively by the contractor following their own health and safety specifications outlined in their CHASPs. Langan personnel are not to operate or assist in the operation of equipment used in construction activities unless defined as part of an inspection or observation in the work plan.

3.1.19 Drum Sampling

Drilling fluid, rinse water, grossly contaminated soil samples, and cuttings will be containerized in 55-gallon drums for disposal off-site. Each drum must be labeled in accordance with the Langan Drum Labeling Standard Operating Procedure (SOP09). Sampling drums requires the donning of work gloves when opening the drums and chemical resistant gloves when sampling in addition to standard PPE.

Langan personnel and contractors are not to move or open any orphaned (unlabeled) drum found on the site without approval of the project manager.

3.2 Radiation Hazards

No radiation hazards are known or expected at the site.

3.3 Physical Hazards

Physical hazards, which may be encountered during site operations for this project, are detailed in Table 1.

3.3.1 Explosion

No explosion hazards are expected for the scope of work at this site.

3.3.2 Heat Stress

The use of Level C protective equipment, or greater, may create heat stress. Monitoring of personnel wearing personal protective clothing should commence when the ambient temperature is 72^{O}F or above. Table 6 presents the suggested frequency for such monitoring. Monitoring frequency should increase as ambient temperature increases or as slow recovery rates are observed. Refer to Table 7 to assist in assessing when the risk for heat-related illness is likely. To use this table, the ambient temperature and relative humidity must be obtained (a

regional weather report should suffice). Heat stress monitoring should be performed by the HSO or the FTL, who must be able to recognize symptoms related to heat stress.

To monitor the workers, be familiar with the following heat-related disorders and their symptoms:

- **Heat Cramps:** Painful spasms of arm, leg, or abdominal muscles, during or after work
- **Heat Exhaustion:** Headache, nausea, dizziness; cool, clammy, moist skin; heavy sweating; weak, fast pulse; shallow respiration, normal temperature
- **Heat Stroke**: Headache, nausea, weakness, hot dry skin, fever, rapid strong pulse, rapid deep respirations, loss of consciousness, convulsions, coma. *This is a life-threatening condition***.**

Do not permit a worker to wear a semi-permeable or impermeable garment when they are showing signs or symptoms of heat-related illness.

To monitor the worker, measure:

- **Heart rate:** Count the radial pulse during a 30-second period as early as possible in the rest period. If the heart rate exceeds 100 beats per minute at the beginning of the rest period, shorten the next work cycle by one-third and keep the rest period the same. If the heart rate still exceeds 100 beats per minute at the next rest period, shorten the following work cycle by one-third. A worker cannot return to work after a rest period until their heart rate is below 100 beats per minute.
- **Oral temperature:** Use a clinical thermometer (3 minutes under the tongue) or a similar device to measure the oral temperature at the end of the work period (before drinking). If oral temperature exceeds 99.6^{o}F (37.6^{o}C), shorten the next work cycle by one-third without changing the rest period. A worker cannot return to work after a rest period until their oral temperature is below 99.6^{o}F. If oral temperature still exceeds 99.6^{o}F (37.6^{o}C) at the beginning of the next rest period, shorten the following cycle by one-third. Do not permit a worker to wear a semi-permeable or impermeable garment when oral temperature exceeds 100.6^{o}F (38.1^{o}C).

Prevention of Heat Stress - Proper training and preventative measures will aid in averting loss of worker productivity and serious illness. Heat stress prevention is particularly important because once a person suffers from heat stroke or heat exhaustion, that person may be predisposed to additional heat-related illnesses. To avoid heat-stress the following steps should be taken:

- Adjust work schedules.
- Mandate work slowdowns as needed.

- Perform work during cooler hours of the day if possible or at night if adequate lighting can be provided.
- Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods.
- Maintain worker's body fluids at normal levels. This is necessary to ensure that the cardiovascular system functions adequately. Daily fluid intake must equal the amount of water lost in sweat, i.e., eight fluid ounces (0.23 liters) of water must be ingested for every eight ounces (0.23 kilograms [kg]) of weight lost. The normal thirst mechanism is not sensitive enough to ensure that enough water will be drunk to replace lost sweat. When heavy sweating occurs, encourage the worker to drink more. The following strategies may be useful:
    - Maintain water temperature 50^{O} to 60^{O}F (10^{O} to 16.6^{O}C).
    - Provide small disposal cups that hold about four ounces (0.1 liters).
    - Have workers drink 16 ounces (0.5 liters) of fluid (preferably water or dilute drinks) before beginning work.
    - Urge workers to drink a cup or two every 15 to 20 minutes, or at each monitoring break. A total of 1 to 1.6 gallons (4 to 6 liters) of fluid per day are recommended, but more may be necessary to maintain body weight.
    - Train workers to recognize the symptoms of heat-related illness.

3.3.3 Cold-Related Illness

If work on this project begins in the winter months, thermal injury due to cold exposure can become a problem for field personnel. Systemic cold exposure is referred to as hypothermia. Local cold exposure is called frostbite.

- **Hypothermia -** Hypothermia is defined as a decrease in the patient core temperature below 96^{O}F. The body temperature is normally maintained by a combination of central (brain and spinal cord) and peripheral (skin and muscle) activity. Interference with any of these mechanisms can result in hypothermia, even in the absence of what normally is considered a "cold" ambient temperature. Symptoms of hypothermia include shivering, apathy, listlessness, sleepiness, and unconsciousness.
- **Frostbite -** Frostbite is both a general and medical term given to areas of local cold injury. Unlike systemic hypothermia, frostbite rarely occurs unless the ambient temperatures are less than freezing and usually less than 20^{O}F. Symptoms of frostbite are a sudden blanching or whitening of the skin; the skin has a waxy or white appearance and is firm to the touch; tissues are cold, pale, and solid.

Prevention of Cold-Related Illness - To prevent cold-related illness:

- Educate workers to recognize the symptoms of frostbite and hypothermia.
- Identify and limit known risk factors:
- Assure the availability of an enclosed, heated environment on or adjacent to the site.
- Assure the availability of dry changes of clothing.
- Assure the availability of warm drinks.
- Start (oral) temperature recording at the job site:
- At the FSO or Field Team Leader's discretion when suspicion is based on changes in a worker's performance or mental status.
- At a worker's request.
- As a screening measure, two times per shift, under unusually hazardous conditions (e.g., wind-chill less than 20^{O}F, or wind-chill less than 30^{O}F with precipitation).
- As a screening measure whenever anyone worker on the site develops hypothermia.

Any person developing moderate hypothermia (a core temperature of 92^{O}F) cannot return to work for 48 hours.

3.3.4 Noise

Work during the proposed activities may be conducted at locations with high noise levels from the operation of equipment. Hearing protection will be used, as necessary.

3.3.5 Hand and Power Tools

The use of hand and power tools can present a variety of hazards, including physical harm from being struck by flying objects, being cut, or struck by the tool, fire, and electrocution. All hand and power tools should be inspected for health and safety hazards prior to use. If deemed unserviceable/un-operable, notify the supervisor and tag equipment out of service. Ground Fault Circuit Interrupters (GFCIs) are required for all power tools requiring direct electrical service.

3.3.6 Slips, Trips, and Fall Hazards

Care should be exercised when walking at the site, especially when carrying equipment. The presence of surface debris, uneven surfaces, pits, facility equipment, and soil piles contribute to tripping hazards and fall hazards. To the extent possible, all hazards should be identified and marked on the site, with hazards communicated to all workers in the area.

3.3.7 Utilities (Electrocution and Fire Hazards)

3.3.7.1 Utility Clearance

The possibility of encountering underground utilities poses fire, explosion, and electrocution hazards. All excavation work will be preceded by a review of available utility drawings and by notification of the subsurface work to N.Y. One –Call--Center.

3.3.7.2 Lockout-Tagout

The potential adverse effects of electrical hazards include burns, arc flashes, and electrocution, which could result in serious injury including death. Therefore, there is a procedure that establishes the requirements for the lockout/tag out (LOTO) of energy isolating devices in accordance with the OSHA electrical lockout and tagging requirements as specified in 29CFR1910.147 and 29 CFR 1926.417. This procedure will be used to ensure that all machines and equipment are isolated from potentially hazardous energy. If possible, equipment that could cause injury due to unexpected energizing, start-up, or release of stored energy will be locked/tagged, before field personnel performs work activities.

The facility owner/operator/representative is to be the authorized person that will initiate and perform the LOTO in accordance with applicable rules and practices. Inerting of electrical power sources is to be completed by an authorized and licensed electrician. Langan personnel will follow LOTO protocols and practices including adding a separate lock/signature to the LOTO chain in accordance with said protocols and practices.

SPECIAL NOTE: Project personnel will assume that all electrical equipment at the surface, subsurface, and overhead locations are energized until equipment has been designated and confirmed as de-energized by a utility company representative. Langan will notify the designated utility representative prior to working adjacent to this equipment and will verify that the equipment is energized or de-energized in the vicinity of the work location. No project work shall be performed by Langan personnel or subcontractors near energized electrical lines or equipment.

The FTL shall accompany the designated facility owner/operator/representative or authorized/licensed electrician in surveying to locate and identify all energy-isolating devices. Langan will note which switches, valves or other isolating devices are used for inerting the equipment and how they are set assuring LOTO. The lockout/tagout procedure involves, but is not limited to, electricity, motors, steam, natural gas, compressed air, hydraulic systems, digesters, sewers, etc.

3.3.8 Adequate Lighting

Indoor or night activities must be done under adequate lighting conditions. The Langan field engineer must be able to clearly see the equipment, all controls and have sufficient lighting to detail color labels. Battery operated lights are sufficient provided they cast a wide enough field to provide the required lighting and there are back-up batteries and emergency flashlights available. Electrically powered lights are suitable provided the electrical source is equipped with a ground fault interrupt circuit (GFIC) and the extensions cords are visually inspected and not used if they show cracked or missing insulation. If a generator is supplying the electricity, it must be outdoors and properly vented.

3.3.9 Physical Hazard Considerations for Material Handling

There are moderate to severe risks associated with moving heavy objects at the Site. The following physical hazards should be considered when handling materials at the Site:

- Heavy objects will be lifted and moved by mechanical devices rather than manual effort whenever possible.
- The mechanical devices will be appropriate for the lifting of moving tasks and will be operated only by trained and authorized personnel.
- Objects that require special handling or rigging will only be moved under the guidance of a person who has been specifically trained to move such objects.
- Lifting devices will be inspected, certified, and labeled to confirm their weight capacities. Defective equipment will be taken out of service immediately and repaired or destroyed.
- The wheels of any trucks being loaded or unloaded will be choked to prevent movement. Outriggers will be fully extended on a flat, firm surface during operation.
- Personnel will not pass under a raised load, nor will a suspended load be left unattended.
- Personnel will not be carried on lifting equipment unless it is specifically designed to carry passengers.
- All reciprocating, rotating, or other moving parts will be guarded at all times.
- Accessible fire extinguishers, currently (monthly) inspected, will be available in all mechanical lifting devices.
- Verify all loads/materials are secure before transportation.

Material handling tasks that are unusual or require specific guidance will need a written addendum to this CHASP. The addendum must identify the lifting protocols before the tasks are performed. Upon approval, the plan must be reviewed with all affected employees and documented. Any deviation from a written plan will require approval by the Langan HSM.

3.3.10 Hearing Conservation

Under the construction industry standard, the maximum permissible occupational noise exposure is 90 A-weighted decibels (dbA) (8-hour TWA), and noise levels in excess of 90 dbA must be reduced through feasible administrative and engineering controls (20 CFR 1926.52). Hearing protection is required when working within 15 feet of vacuum extraction equipment and drill rigs.

3.3.11 Open Water

Employees working over or near water, where the danger of drowning exists, must be provided with U.S. Coast Guard-approved life jackets or buoyant work vests. Prior to and after each use, the buoyant work vests or life preservers must be inspected for defects that would alter their strength or buoyancy. Defective units must not be used.

And should a worker fall into the water, OSHA requires (29 CFR 1926.106(c)) that ring buoys with at least 90 feet of the line must be provided and readily available for emergency rescue operations. The distance between ring buoys must not exceed 200 feet. Another remedial action required by OSHA (29 CFR 1926.106(d)) is the use of lifesaving skiffs.

OSHA requires that at least one lifesaving skiff must be immediately available at locations where employees are working over or adjacent to water and must include the following provisions.

- The skiff must be in the water or capable of being quickly launched by one person.
- At least one person must be present and specifically designated to respond to water emergencies and operate the skiff at all times when there are employees above water.
- When the operator is on break another operator must be designated to provide requisite coverage when there are employees above water.
- The designated operator must either have the skiff staffed at all times or have someone remain in the immediate area such that the operator can quickly reach the skiff and perform rescue services.
- The skiff operator may be assigned other tasks provided the tasks do not interfere with the operator's ability to quickly reach the skiff.
- A communication system, such as a walkie-talkie, must be used to inform the skiff operator of an emergency and to inform the skiff operator where the skiff is needed.
- The skiff must be equipped with both a motor and oars.

With regard to the number of skiffs required and the appropriate maximum response time, the following factors must be evaluated:

- The number of work locations where there is a danger of falling into water.
- The distance to each of those locations.

- Water temperature and currents.
- Other hazards such as, but not limited to, rapids, dams, and water intakes.

Other regulations that present H&S practices and PPE for work on or near water include: 29 CFR 1910, Subpart T (401 – 440)

3.4 Biological Hazards

3.4.1 Animals

There is a possibility of encountering wildlife including reptiles, rodents, and other small and medium-size mammals. Langan personnel are to avoid interacting with any wildlife.

3.4.2 Insects

Ticks and other biting or stinging insects may be encountered during site operations. Langan personnel should take necessary precautions including donning long sleeve shirts and insecticide to prevent bites and stings. After fieldwork, Langan personnel should perform a complete visual inspection of their clothing to insure they are not inadvertently harboring ticks. If they do observe a tick bite, they are to contact the HSM or HSO and report the event.

3.4.3 Plants

Poisonous plants may be encountered during site operations. Langan personnel should take necessary precautions including donning long sleeve shirts and applying preventative poison Ivy/Sumac lotion to prevent or limit the effects of exposure. If after fieldwork, Langan employees do observe a reaction to poisonous plant exposure, they are to contact the HSM or HSO and report the event.

3.4.4 Mold

This section is restricted to subsurface investigations where sampling soil, groundwater, soil or sub-slab vapor or ambient air in an indoor environment with slight to moderate mold impact. Mold exposure symptoms include nasal stuffiness, eye irritation, or wheezing.

The Langan field engineer is required to don a ½ face respirator with a minimum p-100 particulate filter and Tyvek™ type overclothing before entering mold impacted indoor work area. The Langan field engineer must be medically cleared and have been properly fitted for a respirator before donning one.

3.5 Additional Safety Analysis

3.5.1 Presence of Non-Aqueous Phase Liquids (NAPL)

Special care and PPE should be considered when NAPL is observed as NAPL is a typically flammable fluid and releases VOCs known to be toxic and/or carcinogenic. If NAPL is present in a monitoring well, vapors from the well casing may contaminate the work area breathing zone with concentrations of VOCs potentially exceeding health and safety action levels. In addition, all equipment used to monitor or sample NAPL (or ground water from wells containing NAPL) must be intrinsically safe. Equipment that directly contacts NAPL must also be resistant to organic solvents.

At a minimum, a PID should be used to monitor for VOCs when NAPL is observed. If NAPL is expected to be observed in an excavation or enclosed area, air monitoring must be started using calibrated air monitoring equipment designed to sound an audio alarm when atmospheric concentrations of VOC are within 10% of the LEL. In normal atmospheric oxygen concentrations, the LEL monitoring may be done with a Wheatstone bridge/catalytic bead type sensor (i.e., MultiRAE). However, in oxygen-depleted atmospheres (confined space), only an LEL designed to work in low-oxygen environments may be used. Best practices require that the LEL monitoring unit be equipped with a long sniffer tube to allow the LEL unit to remain outside the UST excavation.

When NAPL is present, Langan personnel are required to use disposable nitrile gloves at all times to prevent skin contact with contaminated materials. They should also consider having available a respirator and protective clothing (Tyvek® overalls), especially if NAPL is in abundance and there are high concentrations of VOCs.

All contaminated disposables including PPE and sampling equipment must be properly disposed of in labeled 55-gallon drums.

3.6 Job Safety Analysis

A Job Safety Analysis (JSA) is a process to identify existing and potential hazards associated with each job or task so these hazards can be eliminated, controlled, or minimized. A JSA will be performed at the beginning of each workday, and additionally whenever an employee begins a new task or moves to a new location. All JSAs must be developed and reviewed by all parties involved. A blank JSA form and documentation of completed JSAs are in Attachment G.

4.0 PERSONNEL TRAINING

4.1 Basic Training

Completion of an initial 40-hour HAZWOPER training program as detailed in OSHA's 29 CFR 1910.120(e) is required for all employees working on a site engaged in hazardous substance removal or other activities which expose or potentially expose workers to hazardous substances, health hazards, or safety hazards as defined by 29 CFR 1910.120(a). Annual 8-hour refresher training is also required to maintain competencies to ensure a safe work environment. In addition to these training requirements, all employees must complete the OSHA 10-hour Construction Safety and Health training and supervisory personnel must also receive eight additional hours of specialized management training. Training records are maintained by the HSM.

4.2 Initial Site-Specific Training

Training will be provided to specifically address the activities, procedures, monitoring, and equipment for site operations at the beginning of each field mobilization and the beginning of each discrete phase of work. The training will include the site and facility layout, hazards, and emergency services at the site, and will detail all the provisions contained within this CHASP. For a HAZWOPER operation, training on the site must be for a minimum of 3 days. Specific issues that will be addressed include the hazards described in Section 3.0.

4.3 Tailgate Safety Briefings

Before starting work each day or as needed, the Langan HSO will conduct a brief tailgate safety meeting to assist site personnel in conducting their activities safely. Tailgate meetings will be documented in Attachment H. Briefings will include the following:

- Work plan for the day.
- Review of safety information relevant to planned tasks and environmental conditions.
- New activities/tasks being conducted.
- Results of Jobsite Safety Inspection Checklist.
- Changes in work practices.
- Safe work practices; and
- Discussion and remedies for noted or observed deficiencies.

5.0 MEDICAL SURVEILLANCE

All personnel who will be performing fieldwork involving potential exposure to toxic and hazardous substances (defined by 29 CFR 1910.120(a)) will be required to have passed an initial

baseline medical examination, with follow-up medical exams thereafter, consistent with 29 CFR 1910.120(f). Medical evaluations will be performed by, or under the direction of, a physician board-certified in occupational medicine.

Additionally, personnel who may be required to perform work while wearing a respirator must receive medical clearance as required under CFR 1910.134(e), *Respiratory Protection*. Medical evaluations will be performed by, or under the direction of, a physician board-certified in occupational medicine. Results of medical evaluations are maintained by the HSM.

5.1 Mercury Monitoring

Langan includes medical monitoring for mercury during the initial baseline and annual physical.

5.2 Coronavirus

General Preventative Measures

Field personnel must follow general proper hygiene measures while in the field including:

- Avoid touching eyes, nose, and mouth.
- Cover coughs or sneezes with tissue and throw in the trash.
- Wash hands often with soap and water for 20 seconds after going to the bathroom, before eating, after blowing nose, coughing, or sneezing.
- Use hand sanitizer with at least 60% alcohol if soap and water are not available.
- Avoid physical contact with other people (e.g., no handshakes).
- Maintain a safe distance of at least six feet from other people (social distancing).
- Wear face coverings when around other workers to minimize the spread of COVID-19. (May be required in certain states or locations.)

Construction Trailers

Employees should avoid the use of shared construction trailers or where employees cannot maintain a safe distance (minimum 6 feet) from other workers. If trailer use is needed, areas such as desks, phones, chairs, and other common areas, should be cleaned and disinfected before and after use. Protocols should be developed to minimize trailer use to essential personnel, restrict use from any workers who are ill or showing symptoms of being ill, use face coverings and ensure a safe distance of six feet can be established between workers.

Communication

Include Coronavirus topics and prevention topics in daily tailgate meetings to ensure Coronavirus awareness is communicated daily. Discussions can focus on general topics including social distancing, prevention measures for field personnel, signs and symptoms, and recent news on the Coronavirus. Site-specific topics should include minimizing face-to-face contact, disinfecting/sterilizing field equipment, use of PPE to reduce exposure, site security, use of face coverings, and other potential exposure issues/concerns.

Sick/Ill Workers

No Langan employee is permitted to be onsite when ill and/or showing potential symptoms of the Coronavirus. Symptoms of the Coronavirus may appear 2-14 days after exposure and can range from mild to severe. The most common symptoms include fever, fatigue, dry cough, shortness of breath chills, repeated shaking with chills, muscle pain, headache, sore throat, or new loss of taste or smell. If an employee or subcontractor is observed being ill or exhibiting symptoms of Coronavirus, employees must immediately utilize their Stop Work Authority and contact their project manager to address the situation. If an employee observes another worker onsite exhibiting symptoms of Coronavirus, immediately utilize Stop Work Authority, notify their project manager, and site construction manager or safety officer. Work should resume when the safety and health of Langan and subcontractors is adequately addressed.

6.0 PERSONAL PROTECTIVE EQUIPMENT

6.1 Levels of Protection

Langan will provide PPE to Langan employees to protect them from the specific hazards they are likely to encounter on-site. Directly hired contractors will provide their employees with equivalent PPE to protect them from the specific hazards likely to be encountered on-site. Selection of the appropriate PPE must take into consideration: (1) identification of the hazards or suspected hazards; (2) potential exposure routes; and (3) the performance of the PPE construction (materials and seams) in providing a barrier to these hazards.

Human exposure to contaminants found in the subsurface can occur through three primary routes:

- Inhalation of gases, vapors, dust, or mists is a common route of exposure. Chemicals can enter and irritate the airways and the lungs. They can become deposited in the airways or can be absorbed through the lungs into the bloodstream.
- Direct contact of contaminants with the skin or eyes is a common route of exposure.

Some substances are absorbed through the skin and can enter the bloodstream. Broken, cut, or cracked skin will allow substances to enter the body more easily.

- Ingestion or swallowing of food, drink, or other substances is the third route of exposure. Chemicals that get in or on food, utensils, or hands can be ingested. Substances can be absorbed into the blood.

Based on anticipated site conditions and the proposed work activities to be performed at the site, Level D protection will be used. The upgrading/downgrading of the level of protection will be based on continuous air monitoring results as described in Section 6.0 (when applicable). The decision to modify standard PPE will be made by the site HSO or FTL after conferring with the PM. The levels of protection are described below.

Level D Protection (as needed)

- Safety glasses with side shields or chemical splash goggles
- Safety boots/shoes
- Coveralls (Tyvek® or equivalent)
- Hard hat
- Long sleeve work shirt and work pants
- Nitrile gloves
- Hearing protection
- Reflective safety vest

Level D Protection (Modified, as needed)

- Safety glasses with side shields or chemical splash goggles
- Safety boots/shoes (toe-protected)
- Disposable chemical-resistant boot covers.
- Coveralls (poly-coated Tyvek or equivalent to be worn when contact with wet contaminated soil, groundwater, or non-aqueous phase liquids is anticipated)
- Hard hat
- Long sleeve work shirt and work pants
- Nitrile gloves
- Hearing protection (as needed)
- Personal floatation device (for work within 5 ft of the water)
- Reflective traffic vest

Level C Protection (as needed)

- Full or Half face, air-purifying respirator, with NIOSH approved High-Efficiency Particulate Air (HEPA) filter.
- Inner (latex) and outer (nitrile) chemical-resistant gloves
- Safety glasses with side shields or chemical splash goggles
- Chemical-resistant safety boots/shoes
- Hard hat
- Long sleeve work shirt and work pants
- Coveralls (Tyvek® or equivalent)
- Hearing protection (as needed)
- Reflective safety vest

The action levels used in determining the necessary levels of respiratory protection and upgrading to Level C are summarized in Table 4. The written Respiratory Protection Program is maintained by the HSM and is available if needed. The monitoring procedures and equipment are outlined in Section 6.0 (when applicable).

6.2 Respirator Fit-Test

All Langan employees who may be exposed to hazardous substances at the work site must be in possession of a full or half face piece air-purifying respirator and have been successfully fit-tested within the past year. Fit-test records are maintained by the HSM.

6.3 Respirator Cartridge Change-Out Schedule

Respiratory protection is required to be worn when certain action levels (Table 2) are reached. A respirator cartridge change-out schedule has been developed to comply with 29 CFR 1910.134. The respirator cartridge change-out schedule for this project is as follows:

- Cartridges must be removed and disposed of at the end of each shift when cartridges become wet or the wearer experiences a breakthrough, whichever occurs first.
- If the humidity exceeds 85%, then cartridges must be removed and disposed of after 4 hours of use.

Respirators must not be stored at the end of the shift with contaminated cartridges left on. Cartridges must not be worn on the second day, no matter how short the time period was the previous day they were used.

7.0 AIR QUALITY MONITORING AND ACTIONS LEVELS

7.1 Monitoring During Site Operations

Atmospheric air monitoring results may be collected and used to provide data to determine when exclusion zones need to be established and when certain levels of personal protective equipment are required. For all instruments, there are Site-specific action-level criteria that are used in making field health and safety determinations. Other data, such as the visible presence of contamination or the steady state nature of air contaminant concentration, are also used in making field health and safety decisions. Therefore, the HSO may establish an exclusion zone or require a person to wear a respirator even though atmospheric air contaminant concentrations are below established CHASP action levels.

During site work involving disturbance of petroleum-impacted or fill material, real-time air monitoring may be conducted for methane and VOCs. A MultiRAE LEL/Oxygen (O2) meter and FID will be used to monitor the LEL of methane, and a PID and/or FID will be used to monitor concentrations of VOCs at personnel breathing-zone height. Air monitoring will be the responsibility of the HSO or designee. Air monitoring may be conducted during intrusive activities associated with the completion of excavation, debris removal, and soil grading. All manufacturers' instructions for instrumentation and calibration will be available onsite.

Subcontractors' air monitoring plans must be equal to or more stringent than the Langan plan.

An air monitoring calibration log is provided in Attachment D of this CHASP.

7.1.1 Volatile Organic Compounds

Monitoring with a PID, such as a MiniRAE 2000 (10.6v) or equivalent may occur during intrusive work in the Areas of Concern (AOCs). Colorimetric Indicator Tubes for benzene may be used as a backup for the PID if measurements remain above background monitor every 2 hours. The HSO will monitor the employee's breathing zone at least every 30 minutes, or whenever there is any indication that concentrations may have changed (odors, visible gases, etc.) since the last measurement. If VOC levels are observed above 5 ppm for longer than 5 minutes or if the site PPE is upgraded to Level C, the HSO will begin monitoring the site perimeter at a location downwind of the AOC every 30 minutes in addition to the employee breathing zone. Instrument action levels for monitored gases are provided in Table 4.

7.1.2 Metals

Based upon the site historical fill, there is a potential for the soils to contain Polycyclic Aromatic Hydrocarbons (PAHs) and metals. During invasive procedures which have the potential for

creating airborne dust, such as excavation of dry soils, a real-time airborne dust monitor such as a Mini-Ram may be used to monitor for air particulates. The HSO will monitor the employee's breathing zone at least every 30 minutes, or whenever there is any indication that concentrations may have changed (appearance of visible dust) since the last measurement. If dust levels are observed to be greater than 0.100 milligrams per cubic meter (mg/m^3) or visible dust is observed for longer than 15 minutes or if the site PPE is upgraded to Level C, the HSO will begin monitoring the site perimeter at a location downwind of the AOC every 30 minutes in addition to the employee breathing zone. Instrument action levels for dust monitoring are provided in Table 4.

7.1.3 Methane

During soil excavation or other intrusive activities, direct reading air monitoring will be performed in the excavation area to determine exposure to workers. Monitoring with an LEL/O2 meter and FID may occur during intrusive work in the AOCs. The HSO will monitor the employee's breathing zone at least hourly during intrusive activities. If LEL levels are observed above 20% the professional engineer (PE) or their designee will stop work and evacuate the area; warn others; and determine source of readings and take corrective actions. The Contractor will be responsible for mitigating explosive gas levels.

7.2 Monitoring Equipment Calibration and Maintenance

Instrument calibration must be documented and included in a dedicated safety and health logbook or on separate calibration pages of the field book. All instruments must be calibrated before and after each shift. Calibration checks may be used during the day to confirm instrument accuracy. Duplicate readings may be taken to confirm individual instrument responses.

All instruments must be operated in accordance with the manufacturers' specifications. Manufacturers' literature, including an operation manual for each piece of monitoring equipment, will be maintained on-site by the HSO for reference.

7.3 Determination of Background Levels

Background (BKD) levels for VOCs, dust, and methane will be established prior to intrusive activities within the AOC at an upwind location. A notation of BKD levels will be referenced in the daily monitoring log. BKD levels are a function of prevailing conditions. BKD levels will be taken in an appropriate upwind location as determined by the HSO.

Table 4 lists the instrument action levels.

8.0 COMMUNITY AIR MONITORING PROGRAM

Community air monitoring may be conducted in compliance with local standards. If conducted, Langan will implement the generic CAMP outlined below amended to comply with local conditions or standards:

Monitoring for dust and odors will be conducted during all ground intrusive activities by the FTL. Continuous monitoring of the perimeter of the work zones for odor, VOCs, and dust may be required for all ground intrusive activities such as soil excavation and handling activities. The work zone is defined as the general area in which machinery is operating in support of remediation activities. A portable PID will be used to monitor the work zone and for periodic monitoring for VOCs during activities such as soil and groundwater sampling and soil excavation. The site perimeter will be monitored for fugitive dust emissions by visual observations as well as instrumentation measurements (if required). When required, particulate or dust will be monitored continuously with real-time field instrumentation that will meet, at a minimum, the local standards or, default to the performance standards below:

If VOC monitoring is required, the following actions will be taken based on VOC levels measured:

- If total VOC levels exceed 5 ppm above background for the 15-minute average at the perimeter, work activities will be temporarily halted and monitoring continued. If levels readily decrease (per instantaneous readings) below 5 ppm above background, work activities will resume with continued monitoring.
- If total VOC levels at the downwind perimeter of the hot zone persist at levels in excess of 5 ppm above background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps work activities will resume provided that the total organic vapor level is 200 feet downwind of the hot zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less – but in no case less than 20 feet, is below 5 ppm above background for the 15-minute average.
- If the total VOC level is above 25 ppm at the perimeter of the hot zone, activities will be shut down.

If dust monitoring with field instrumentation is required, the following actions will be taken based on instrumentation measurements:

- If the downwind particulate level is 100 micrograms per cubic meter ($\mu g/m^3$) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression must be employed. Work may continue with dust suppression techniques provided that downwind particulate matter less than

10 microns (PM10) levels do not exceed 150 µg/m³ above the background level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM10 levels are greater than 150 µg/m³ above the background level, work must be stopped, and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM10 concentration to within 150 µg/m³ of the upwind level and in preventing visible dust migration.

8.1 Dust Suppression Techniques

Preventative measures for dust generation may include wetting site fill and soil, construction of an engineered construction entrance with a gravel pad, a truck wash area, covering soils with tarps, and limiting vehicle speeds to five miles per hour.

Work practices to minimize odors and vapors include limiting the time that the excavations remain open, minimizing stockpiling of contaminated-source soil, and minimizing the handling of contaminated material. Offending odor and organic vapor controls may include the application of foam suppressants or tarps over the odor or VOC source areas. Foam suppressants may include biodegradable foams applied over the source material for short-term control of the odor and VOCs.

If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include direct load-out of soils to trucks for off-site disposal; use of chemical odorants in spray or misting systems; and use of staff to monitor odors in surrounding neighborhoods.

Where odor nuisances have developed during remedial work and cannot be corrected, or where the release of nuisance odors cannot otherwise be avoided due to on-site conditions or proximity to sensitive receptors, odor control will be achieved by sheltering excavation and handling areas under tented containment structures equipped with appropriate air venting/filtering systems.

9.0 WORK ZONES AND DECONTAMINATION

9.1 Site Control

Work zones are intended to control the potential spread of contamination throughout the site and to assure that only authorized individuals are permitted into potentially hazardous areas.

Any person working in an area where the potential for exposure to site contaminants exists will only be allowed access after providing the HSO with proper training and medical documentation.

Exclusion Zone (EZ) - All activities which may involve exposure to site contaminants, hazardous materials, and/or conditions should be considered an EZ. Decontamination of field equipment will also be conducted in the Contaminant Reduction Zone (CRZ) which will be located on the perimeter of the EZ. The EZ and the CRZ will be delineated by cones, tapes, or other means. The HSO may establish more than one EZ where different levels of protection may be employed, or different hazards exist. The size of the EZ must be determined by the HSO allowing adequate space for the activity to be completed, field members, and emergency equipment.

9.2 Contamination Zone

9.2.1 Personnel Decontamination Station

Personal hygiene, coupled with diligent decontamination, will significantly reduce the potential for exposure.

9.2.2 Minimization of Contact with Contaminants

During the completion of all site activities, personnel should attempt to minimize the chance of contact with contaminated materials. This involves a conscientious effort to keep "clean" during site activities. All personnel should minimize kneeling, splash generation, and another physical contact with contamination as PPE is intended to minimize accidental contact. This may minimize the degree of decontamination required and the generation of waste materials from site operations.

Field procedures will be developed to control spray and runoff and to ensure that unprotected personnel working nearby are not affected.

9.2.3 Personnel Decontamination Sequence

Decontamination may be performed by removing all PPE used in EZ and placing it in drums/trash cans at the CRZ. Baby wipes should be available for wiping hands and face. Drums/trash cans will be labeled by the field crews in accordance with all local, state, and federal requirements. Management plans for contaminated PPE, and tools are provided below.

9.2.4 Emergency Decontamination

If circumstances dictate that contaminated clothing cannot be readily removed, then remove gross contamination and wrap injured personnel with clean garments/blankets to avoid

contaminating other personnel or transporting equipment. If the injured person can be moved, he/she will be decontaminated by site personnel as described above before emergency responders handle the victim. If the person cannot be moved because of the extent of the injury (a back or neck injury), provisions must be made to ensure that emergency response personnel will be able to respond to the victim without being exposed to potentially hazardous atmospheric conditions. If the potential for inhalation hazards exists, such as with open excavation, this area will be covered with polyethylene sheeting to eliminate any potential inhalation hazards. All emergency personnel should be immediately informed of the injured person's condition, and potential contaminants, and provided with all pertinent data.

9.2.5 Hand-Held Equipment Decontamination

Hand-held equipment includes all monitoring instruments as stated earlier, samples, hand tools, and notebooks. The hand-held equipment is dropped at the first decontamination station to be decontaminated by one of the decontamination team members. These items must be decontaminated or discarded as waste prior to removal from the CRZ.

To aid in decontamination, monitoring instruments can be sealed in plastic bags or wrapped in polyethylene. This will also protect the instruments against contaminants. The instruments will be wiped clean using wipes or paper towels if contamination is visually evident. Sampling equipment, hand tools, etc. will be cleaned with non-phosphorous soap to remove any potentially contaminated soil and rinsed with deionized water. All decontamination fluids will be containerized and stored on-site pending waste characterization sampling and appropriate off-site disposal.

9.2.6 Heavy Equipment Decontamination

All heavy equipment and vehicles arriving at the work site will be free from contamination from offsite sources. Any vehicles arriving to work that are suspected of being impacted will not be permitted on the work site. Potentially contaminated heavy equipment will not be permitted to leave the EZ unless it has been thoroughly decontaminated and visually inspected by the HSO or his designee.

9.3 Support Zone

The support zone or cold zone will include the remaining areas of the job site. Break areas and support facilities (including equipment storage and maintenance areas) will be located in this zone. No equipment or personnel will be permitted to enter the cold zone from the hot zone without passing through the decontamination station in the warm zone (if necessitated). Eating, smoking, and drinking will be allowed only in this area.

9.4 Communications

The following communications equipment will be utilized as appropriate.

- Telephones - A cellular telephone will be located with the HSO for communication with the HSM and emergency support services/facilities.
- Hand Signals - Hand signals must be used by field teams, along with the buddy system. The entire field team must know them before operations commence and their use covered during site-specific training. Typical hand signals are the following:

Hand Signal	Meaning
Hand gripping throat	Out of air, cannot breathe
Grip your partner's wrists or place both hands around the waist	Leave immediately without debate
Hands on top of head	Need assistance
Thumbs up	OK; I am all right; I understand
Thumbs down	No; negative
Simulated "stick" break with fists	Take a break; stop work

9.5 The Buddy System

When working in teams of two or more, workers will use the "buddy system" for all work activities to ensure that rapid assistance can be provided in the event of an emergency. This requires work groups to be organized such that workers can remain close together and maintain visual contact with one another. Workers using the "buddy system" have the following responsibilities:

- Provide his/her partner with assistance.
- Observe his/her partner for signs of chemical or heat exposure.
- Periodically check the integrity of his/her partner's PPE.
- Notify the HSO or other site personnel if emergency service is needed.

10.0 NEAREST MEDICAL ASSISTANCE

The address and telephone number of the nearest hospital:

New York Hospital Queens
56-45 Main Street
Flushing, New York
718-670-1231

A map with directions to the hospital is shown in Figure 2. This information will either be posted prominently at the site or will be available to all personnel all of the time. Further, all field personnel, including the HSO & FTL, will know the directions to the hospital.

11.0 STANDING ORDERS/SAFE WORK PRACTICES

The standing orders, which consist of a description of safe work practices that must always be followed while on-site by Langan employees and contractors, are shown in Attachment A. The site HSO and FTL each have the responsibility for enforcing these practices. The standing orders will be posted prominently at the site or are made available to all personnel at all times. Those who do not abide by these safe work practices will be removed from the site.

12.0 SITE SECURITY

No unauthorized personnel must be permitted access to the work areas.

13.0 UNDERGROUND UTILITIES

As provided in Langan's Underground Utility Clearance Guidelines, the following safe work practices should be followed by Langan personnel and the contractor before and during subsurface work in accordance with federal, state, and local regulations:

- Obtain available utility drawings from the property owner/client or operator.
- Provide utility drawings to the project team.
- In the field, mark the proposed area of subsurface disturbance (when possible).
- Ensure that the utility clearance system has been notified.
- Ensure that utilities are marked before beginning subsurface work.
- Discuss subsurface work locations with the owner/client and contractors.
- Obtain approval from the owner/client and operators for proposed subsurface work locations.
- Use safe digging procedures when applicable.
- Stay at least 10 feet from all equipment performing subsurface work.

14.0 SITE SAFETY INSPECTION

The Langan HSO or alternate will check the work area daily, at the beginning and end of each work shift, or more frequently to ensure safe work conditions. The HSO or alternate must complete the Jobsite Safety Inspection Checklist, found in Attachment F. Any deficiencies must be shared with the FTL, HSM, and PM and will be discussed at the daily tailgate meeting.

15.0 HAND AND POWER TOOLS

All hand- and electric-power tools and similar equipment must be maintained in a safe operating condition. All electric-power tools must be inspected before initial use. Damaged tools must be removed immediately from service or repaired. Tools must be used only for the purpose for which they were designed. All users must be properly trained in their safe operation.

16.0 EMERGENCY RESPONSE

16.1 General

This section establishes procedures and provides information for use during a project emergency. Emergencies happen unexpectedly and quickly, and require an immediate response; therefore, contingency planning and advanced training of staff is essential. Specific elements of emergency support procedures that are addressed in the following subsections include communications, local emergency support units, and preparation for medical emergencies, first aid for injuries incurred on site, record keeping, and emergency site evacuation procedures. In case of emergency, in addition to 911, call *WorkCare - Incident Intervention®* at 1-888-479-7787 to report their injuries. For all other communications, contact the Langan Incident Hotline at **973-560-4699** as soon as possible.

Should outside assistance be needed for accidents, fire, or release of hazardous substances, the emergency numbers will be available and posted at the site (Table 5) where a readily accessible telephone is made available for emergency use.

Also, in the event of an incident where a team member becomes exposed or suffers from an acute symptom from contact with site materials and has to be taken to a hospital, a short medical data sheet (Attachment C) for that individual will be made available to the attending physician. The medical data sheet will include the following:

- Name, address, home phone
- Age, height, weight
- Name of person to be notified in case of an accident.
- Allergies
- Particular sensitivities
- Does he/she wear contact lenses?
- Short checklist of previous illness
- Name of personal physician and phone
- Name of company physician and phone
- Prescription and non-prescription medications currently used.

An incident reporting form is included in Attachment C.

16.2 Responsibilities

16.2.1 Health and Safety Officer (HSO)

The HSO is responsible for ensuring that all personnel are evacuated safely, and that machinery and processes are shut down or stabilized in the event of a stop work order or evacuation. The HSO is responsible for ensuring the HSM is notified of all incidents, all injuries, near misses, fires, spills, releases, or equipment damage. The HSO is required to immediately notify the HSM of any fatalities or catastrophes (three or more workers injured and hospitalized) so that the HSM can notify OSHA within the required time limit.

16.2.2 Emergency Coordinator

The HSO or their designated alternate will serve as the Emergency Coordinator. The Emergency Coordinator is responsible for ensuring that all personnel are evacuated safely, and that machinery and processes are shut down or stabilized in the event of a stop work order or evacuation. They are also responsible for ensuring the HSM is notified of all incidents, all injuries, near misses, fires, spills, releases, or equipment damage. The Emergency Coordinator is required to immediately notify the HSM of any fatalities or catastrophes (three or more workers injured and hospitalized.

The Emergency Coordinator must locate emergency phone numbers and identify hospital routes prior to beginning work on the sites. The Emergency Coordinator must make necessary arrangements to be prepared for any emergencies that could occur.

The Emergency Coordinator is responsible for implementing the Emergency Response Plan.

16.2.3 Site Personnel

Project site personnel are responsible for knowing the Emergency Response Plan and the procedures contained herein. All personnel are expected to notify the Emergency Coordinator of situations that could constitute a site emergency. Project site personnel, including all subcontractors, will be trained in the Emergency Response Plan.

16.3 Communications

Once an emergency situation has been stabilized, the injured Langan personnel should contact *WorkCare - Incident Intervention®* at 1-888-479-7787 to report their injuries. For all other communications, contact the Langan Incident Hotline at **973-560-4699** as soon as possible.

16.4 Local Emergency Support Units

In order to be able to deal with any emergency that might occur during investigative activities at the site, the Emergency Notification Numbers (Table 5) will be posted and provided to all personnel conducting work within the EZ.

Figure 2 shows the hospital route map. Outside emergency number 911 and local ambulance should be relied on for response to medical emergencies and transport to emergency rooms. Always contact first responders when there are serious or life-threatening emergencies on the site. Project personnel are instructed not to drive injured personnel to the Hospital. In the event of an injury, provide first aid and keep the injured party calm and protected from the elements, and treat for shock when necessary.

16.5 Pre-Emergency Planning

Langan will communicate directly with administrative personnel from the emergency room at the hospital to determine whether the hospital has the facilities and personnel needed to treat cases of trauma resulting from any of the contaminants expected to be found on the site. Instructions for finding the hospital will be posted conspicuously in the site office and each site vehicle.

16.6 Emergency Medical Treatment

The procedures and rules in this CHASP are designed to prevent employee injury. However, if an injury occurs, no matter how slight, it will be reported to the HSO immediately. First-aid equipment will be available on-site at the following locations:

- First Aid Kit: Contractor Vehicles
- Emergency Eye Wash: Contractor Vehicles

During the site safety briefing, project personnel will be informed of the location of the first aid station(s) that has been set up. Some injuries, such as severe cuts and lacerations or burns, may require immediate treatment. First-aid instructions provided from off-site doctors or paramedics, before an emergency-response squad arrives at the site or before the injured person can be transported to the hospital, will be followed closely. Only in non-emergency situations may an injured person be transported to an urgent care facility. Due to hazards that may be present at the site and the conditions under which operations are conducted, an emergency may develop. Emergencies can be characterized as injury or acute chemical exposure to personnel, fire or explosion, environmental release, or hazardous weather conditions.

16.8 Emergency Site Evacuation Routes and Procedures

All project personnel will be instructed on proper emergency response procedures and locations of emergency telephone numbers during the initial site safety meeting. If an emergency occurs as a result of the site investigation activities, including but not limited to fire, explosion, or significant release of toxic gas into the atmosphere, the Langan Project Manager will be verbally notified immediately. All heavy equipment will be shut down and all personnel will evacuate the work areas and assemble at the nearest intersection to be accounted for and to receive further instructions.

If an emergency arises, the FTL will implement an immediate evacuation of all project personnel due to immediate or impending danger. The FTL will also immediately communicate with the contractor to coordinate any needed evacuation of the property.

The FTL or Site Supervisor will give necessary instructions until the Designated Incident Commander (IC) assumes control. After the emergency has been resolved, the FTL or Site Supervisor will coordinate with the IC and indicate when staff should resume their normal duties. If dangers are present for those at the designated assembly point, another designated location of assembly will be established.

It will be the responsibility of the FTL or Site Supervisor to report a fire or emergency, assess the seriousness of the situation, and initiate emergency measures until the arrival of the local fire fighters or other first responders, should they be necessary. The FTL, working with emergency responders, may also order the closure of the Site for an indefinite period as long as it is deemed necessary.

Under no circumstances will incoming visitors be allowed to proceed to the area of concern once an emergency evacuation has been implemented. Visitors or other persons present in the area of the emergency must be instructed to evacuate the area. The FTL will ensure that access roads are not obstructed and will remain on-site to provide stand-by assistance upon the arrival of emergency personnel.

If it is necessary to temporarily control traffic in the event of an emergency, those persons controlling traffic will wear proper reflection warning vests until the arrival of police or fire personnel.

16.8.1 Designated Assembly Locations

All personnel will evacuate the site and assemble at a designated assembly location. The assembly location will be designated by Langan personnel and discussed during each shift's pre-job safety briefing.

16.8.2 Accounting for Personnel

All contractor and subcontractor supervisors are responsible for the accounting of all personnel assembled at the designed assembly area. The Designated Incident Commander must be notified if personnel are not found.

16.9 Fire Prevention and Protection

In the event of a fire or explosion, procedures will include immediately evacuating the site and notification of the Langan Project Manager of the investigation activities. Portable fire extinguishers will be provided at the work zone. The extinguishers located in the various locations should also be identified prior to the start of work. No personnel will fight a fire beyond the stage where it can be put out with a portable extinguisher (incipient stage).

16.9.1 Fire Prevention

Fires will be prevented by adhering to the following precautions:

- Good housekeeping and storage of materials.
- Storage of flammable liquids and gases away from oxidizers.
- Shutting off engines to refuel.
- Grounding and bonding metal containers during transfer of flammable liquids.
- Use of UL approved flammable storage cans.
- Fire extinguishers rated at least 10 pounds ABC located on all heavy equipment, in all trailers and near all hot work activities.

The person responsible for the control of fuel source hazards and the maintenance of fire prevention and/or control equipment is the HSO.

16.10 Significant Vapor Release

Based on the proposed tasks, the potential for a significant vapor release is low. However, if a release occurs, the following steps will be taken:

- Move all personnel to an upwind location. All non-essential personnel must evacuate.
- Upgrade to Level C Respiratory Protection.
- Downwind perimeter locations must be monitored for volatile organics.
- If the release poses a potential threat to human health or the environment in the community, the Emergency Coordinator must notify the Langan Project Manager.
- Local emergency response coordinators will be notified.

16.11 Overt Chemical Exposure

The following are standard procedures to treat chemical exposures. Other, specific procedures detailed on the Material Safety Data Sheet (MSDS) will be followed, when necessary.

SKIN AND EYE: Use copious amounts of soap and water from eye-wash kits and portable hand-wash stations.

CONTACT: Wash/rinse affected areas thoroughly, then provide appropriate medical attention. Skin must also be rinsed for 15 minutes if contact with caustics, acids, or hydrogen peroxide occurs. Affected items of clothing must also be removed from contact with skin.

Providing wash water and soap will be the responsibility of each individual contractor or subcontractor on-site.

16.12 Decontamination during Medical Emergencies

If emergency lifesaving first aid and/or medical treatment is required, normal decontamination procedures may need to be abbreviated or omitted. The HSO or designee will accompany contaminated victims to the medical facility to advice on matters involving decontamination when necessary. The outer garments can be removed if they do not cause delays, interfere with treatment, or aggravate the problem. Respiratory equipment must always be removed. Protective clothing can be cut away. If the outer contaminated garments cannot be safely removed on site, a plastic barrier placed between the injured individual and clean surfaces should be used to help prevent contamination of the inside of ambulances and/or medical personnel. Outer garments may then be removed at the medical facility. No attempt will be made to wash or rinse the victim if his/her injuries are life threatening unless it is known that the individual has been contaminated with an extremely toxic or corrosive material which could also cause severe injury or loss of life to emergency response personnel. For minor medical problems or injuries, normal decontamination procedures will be followed.

16.13 Adverse Weather Conditions

In the event of adverse weather conditions, the HSO will determine if work will continue without potentially risking the safety of all field workers. Some of the items to be considered prior to determining if work should continue are:

- Potential for heat stress and heat-related injuries.
- Potential for cold stress and cold-related injuries.
- Treacherous weather-related working conditions (hail, rain, snow, ice, high winds).
- Limited visibility (fog).

- Potential for electrical storms.
- Earthquakes.
- Other major incidents.

Site activities will be limited to daylight hours, or when suitable artificial light is provided, and acceptable weather conditions prevail. The HSO will determine the need to cease field operations or observe daily weather reports and evacuate, if necessary, in case of severe inclement weather conditions.

16.14 Spill Control and Response

All small spills/environmental releases must be contained as close to the source as possible. Whenever possible, the MSDS will be consulted to assist in determining proper waste characterization and the best means of containment and cleanup. For small spills, sorbent materials such as sand, sawdust, or commercial sorbents should be placed directly on the substance to contain the spill and aid recovery. Any acid spills should be diluted or neutralized carefully prior to attempting recovery. Berms of earthen or sorbent materials can be used to contain the leading edge of the spills. All spill containment materials will be properly disposed of. An exclusion zone of 50 to 100 feet around the spill area should be established depending on the size of the spill.

All contractor vehicles must have spill kits on them with enough material to contain and absorb the worst-case spill from that vehicle. All vehicles and equipment must be inspected prior to being admitted on-site. Any vehicle or piece of equipment that develops a leak will be taken out of service and removed from the job site.

The following seven steps must be taken by the Emergency Coordinator:

1. Determine the nature, identity, and amounts of major spills.
2. Make sure all unnecessary persons are removed from the spill area.
3. Notify the HSO immediately.
4. Use proper PPE in consultation with the HSO.
5. If a flammable liquid, gas, or vapor is involved, remove all ignition sources, and use non-sparking and/or explosion-proof equipment to contain or clean up the spill (diesel-only vehicles, air-operated pumps, etc.)
6. If possible, try to stop the leak with the appropriate material.
7. Remove all surrounding materials that can react or compound with the spill.

In addition to the spill control and response procedures described in this CHASP, Langan personnel will coordinate with the designated project manager relative to spill response and

control actions. Notification to the Project Manager must be immediate and, to the extent possible, include the following information:

- Time and location of the spill.
- Type and nature of the material spilled.
- Amount spilled.
- Whether the spill has affected or has a potential to affect a waterway or sewer.
- A brief description of affected areas/equipment.
- Whether the spill has been contained.
- Expected time of cleanup completion. If spill cleanup cannot be handled by Langan's on-site personnel alone, such fact must be conveyed to the Project Manager immediately.

Langan field personnel must notify the project manager when they observe a spill or encounter conditions suggesting one might have occurred.

16.15 Emergency Equipment

The following minimum emergency equipment must be kept and maintained on site:

- Industrial first aid kit.
- Fire extinguishers (one per site).

16.16 Restoration and Salvage

After an emergency, prompt restoration of utilities, fire protection equipment, medical supplies, and other equipment will reduce the possibility of further losses. Some of the items that may need to be addressed are:

- Refilling fire extinguishers.
- Refilling medical supplies.
- Recharging eyewashes and/or showers.
- Replenishing spill control supplies.

16.17 Documentation

Immediately following an incident or near miss, unless emergency medical treatment is required, either the employee or a coworker must contact the Langan Incident/Injury Hotline at 1-(800)-9-LANGAN (extension 4699) and the client representative to report the incident or near miss. For emergencies involving personnel injury and/or exposure, the HSO and affected employee will complete and submit an Employee Exposure/Injury Incident Report (Attachment C) to the Langan Corporate Health and Safety Manager as soon as possible following the incident.

17.0 SPECIAL CONDITIONS

This guideline contains information and requirements for special conditions that may not be routinely encountered.

17.1 Scope

The guideline applies to the specific projects identified within this document. Additional provisions will be addressed in each Site-Specific CONSTRUCTION HEALTH AND SAFETY PLAN (CHASP), as needed.

17.2 Responsibilities

Site Personnel - All site personnel must be alert to safety hazards on work sites and take action to minimize such hazards. Personnel must utilize the buddy system, watch for inappropriate behavior, and be alerted to changes in site conditions.

Health and Safety Officer (HSO) - The HSO is responsible for considering these procedures in the development of site-specific CHASPs. The HSO must schedule frequent "tail gate" safety briefings to enhance safety awareness and discuss potential problems.

17.3 Procedures

The procedures outlined below must be followed when such conditions are encountered.

17.3.1 Ladders

Langan safety procedures must be used to ensure employee safety when using ladders in the office or work sites. All ladders must be coated or repaired to prevent injury to the employee from punctures or lacerations and to prevent snagging or clothing. Any wood ladders used must have an opaque covering except for identification or warning labels, which may be placed on one face only of a side rail.

17.3.1.1 Ladder Use

Employees must only use ladders for the purposes they were designed for and must not be used as scaffolding. Ladders will be maintained and inspected prior to use for slip hazards including oil and grease. Employees must use ladders only on stable and level surfaces unless the ladder is secured to prevent displacement. Ladders should not be used on slippery surfaces unless secured or provided with slip-resistant feet to prevent accidental displacement. Ladders should not be used in locations where they could be displaced by workplace activities or traffic. Ladder

rungs, cleats and steps must be parallel, level and uniformly spaced when the ladder is in the use position.

Employees should not be carrying anything including equipment that could cause injury if there was a fall while utilizing the ladder. The top and bottom of the ladder area must remain clear while in use. When ascending and descending the ladder, employees must face the ladder.

Ladders must not be loaded beyond the maximum intended load for which they were built or the manufacturer's rated capacity.

17.3.1.2 Portable Ladders

Rungs, cleats, and steps for portable ladders and fixed ladders must be spaced not less than 10 inches apart, nor more than 14 inches apart, as measured between center lines of the rungs, cleats, and steps. When used to access an upper landing surface, the ladder side rails must extend at least three feet above the upper landing surface to which the ladder is used to gain access. If this is not possible, due to the length of the ladder, then the top of the ladder must be secured at its top to a rigid support.

17.3.1.3 Step Stools

Rungs, cleats, and steps of step stools must not be less than 8 inches apart, nor more than 12 inches apart, as measured between center lines of the rungs, cleats, and steps.

17.3.1.4 Extension Ladders

Rungs, cleats, and steps of the base section of extension trestle ladders must be spaced not less than 8 inches apart, nor more than 18 inches apart, as measured between center lines of the rungs, cleats, and steps. The rung spacing on the extension section of the extension trestle ladder must not be less than 6 inches nor more than 12 inches, as measured between the center lines of the rungs, cleats and steps. Ladders must be used at an angle such that the horizontal distance from the top support to the foot of the ladder is approximately one-quarter of the working length of the ladder (the distance along the ladder between the foot and the top support).

17.3.1.5 Inspection

Ladders will be inspected for visible detects periodically, prior to utilization or after any occurrence that could have negatively affected the ladder. Portable ladders with defects including broken or missing rungs, cleats, or steps, broken or split rails, corroded components, or other faulty components must not be used. The ladder will be immediately marked as defective, tagged as "Do Not Use" or blocked from being used and removed from service until repaired.

17.3.2 First Aid/Cardiopulmonary Resuscitation (CPR)

Langan field and office personnel will be encouraged to be trained in First Aid and Cardiopulmonary Resuscitation (CPR). Training will be provided free of charge by Langan to all employees. Employees will receive a training certificate that will be kept on file with the Health & Safety Coordinator (HSC). Training and certification will be provided by a credited provider such as American Red Cross or equivalent.

17.3.2.1 Emergency Procedures

Prior to site work, the Langan employees certified in first aid and CPR will be identified in the site-specific CHASP. Langan will endear to have at least one employee at a job site trained and able to render first aid and CPR. The site-specific CHASP will contain first aid information on both potential chemical and physical hazards. Emergency procedures to be followed in case of injury or illnesses are provided in the CHASP. The CHASP will include emergency contact information including local police and fire departments, hospital emergency rooms, ambulance services, on-site medical personnel, and physicians. The CHASP will also include directions and contact information for the nearest emergency facility in case immediate medical attention is required. The emergency contact information will be conspicuously posted at the worksite. Employees that are injured and require immediate medical attention must call either 911 or the local posted emergency contacts. Employees should use ambulatory services to transport injured workers to the nearest facility for emergency medical care. In areas where 911 is not available, the telephone numbers of physicians, hospitals, or ambulances must be conspicuously posted.

17.3.2.2 First Aid Supplies

First aid supplies are readily available to all Langan employees when required. First aid kits are located in each Langan office. Portable first aid kits are available for employees to use at work sites. First aid kits should consist of items needed to treat employees for potential chemical and physical injuries. At a minimum, first aid kits should contain items to allow basic first aid to be rendered. Where the eyes or body of an employee may be exposed to corrosive materials, suitable facilities for quick drenching or flushing of the eyes and body must be provided within the work area for immediate emergency use including eye wash.

First aid kits will be weatherproof with individually sealed packages of each item. All portable first aid kits must be inspected by Langan employees before and after use to ensure all used items are replaced. When out in the field, employees must check first aid kits weekly to ensure used items are replaced.

17.3.3 Hydrogen Sulfide

Langan employees with the potential to be exposed to hydrogen sulfide while at work sites must have training in hydrogen sulfide awareness. The training will include the identification of areas where employees could be exposed to hydrogen sulfide, health effects, permissible exposure limits, first aid procedures, and personnel protective equipment. Langan employees could be exposed to hydrogen sulfide while at job sites including petroleum refineries, hazardous waste treatment, storage and disposal facilities, uncontrolled hazardous waste sites, and remediation projects.

17.3.3.1 Characteristics

Hydrogen sulfide is a colorless gas with a strong odor of rotten eggs that is soluble in water. Hydrogen sulfide is used to test and make other chemicals. It is also found as a by-product of chemical reactions, such as in sewer treatment. It is a highly flammable gas and a dangerous fire hazard. Poisonous gases are produced in fires including sulfur oxides. Hydrogen sulfide is not listed as a carcinogen.

17.3.3.2 Health Effects

Hydrogen Sulfide can affect employees if inhaled or through contact with skin or eyes. Acute (or short-term) health effects of hydrogen sulfide exposure include irritation of the nose and throat, dizziness, confusion, headache, and trouble sleeping. Inhalation of hydrogen sulfide can irritate the lungs causing coughing and/or shortness of breath. Higher levels of exposure can cause a build-up of fluid in the lungs (pulmonary edema), a medical emergency, with severe shortness of breath.

Chronic (or long-term) health effects of low levels of exposure to hydrogen sulfide can cause pain and redness of the eyes with blurred vision. Repeated exposure may cause bronchitis with cough, phlegm, and shortness of breath.

17.3.3.3 Protective Clothing and Equipment

Respirators are required for those operations in which employees will be exposed to hydrogen sulfide above OSHA permissible exposure level. The maximum OSHA permissible exposure limit (PEL) for hydrogen sulfide is 20 parts of hydrogen sulfide vapor per million parts of air (20 ppm) for an 8-hour workday and the maximum short-term exposure limit (STEL) is 10 ppm for any 10-minute period.

Where employees are exposed to levels up to 100 parts of hydrogen sulfide vapor per million parts of air (100 ppm), the following types of respiratory protection are allowed:

- Any powered, air-purifying respirator with cartridge(s).
- Any air-purifying, full-facepiece respirator (gas mask) with a chin style, front- or back-mounted canister.
- Any supplied air system with escape self-contained breathing apparatus, if applicable; and,
- Any self-contained breathing apparatus with a full facepiece.

Respirators used by employees must have joint Mine Safety and Health Administration and the National Institute for Occupational Safety and Health (NIOSH) seal of approval. Cartridges or canisters must be replaced before the end of their service life, or the end of the shift, whichever occurs first. Langan employees that have the potential to be exposed to hydrogen sulfide will be trained in the proper use of respirators. Respirator training is discussed under– Langan's Respiratory Protection Program.

Employees with potential exposure to hydrogen sulfide, or when required by the client, will wear a portable hydrogen sulfide gas detector. The detector should have an audible, visual, and vibrating alarm. The detector may also provide detection for carbon monoxide, sulfur dioxide, and oxygen-deficient atmospheres. The hydrogen sulfide monitor will, at a minimum, be calibrated to detect hydrogen sulfide at a level of 20 parts of hydrogen sulfide vapor per million parts of air (20 ppm). Many portable gas detectors will have factory defaults with a low-level alarm at 10 ppm and a high-level alarm at 15 ppm. Langan employees must consult clients to determine if any site-specific threshold levels exist.

If the hydrogen sulfide gas detector sounds and employees are not wearing appropriate respiratory protection, employees must immediately vacate the area and meet at the assigned emergency location. Langan employees may not re- enter the site without proper respiratory protection and approval from the client or property owner if needed.

Employees must wear PPE to prevent eye and skin contact with hydrogen sulfide. Employees must wear appropriate protective clothing including boots, gloves, sleeves, and aprons, over any parts of their body that could be exposed to hydrogen sulfide. Non-vented, impact-resistant goggles should be worn when working with or exposed to hydrogen sulfide.

17.3.3.4 Emergency and First Aid Procedures

Eye and Face Exposure

If hydrogen sulfide comes in contact with eyes, it should be washed out immediately with large amounts of water for 30 minutes, occasionally lifting the lower and upper eye lids. Seek medical attention immediately.

Skin Exposure

If hydrogen sulfide contaminates clothing or skin, remove the contaminated clothing immediately and wash the exposed skin with large amounts of water and soap. Seek medical attention immediately. Contaminated clothing should either be disposed of or washed before wearing again.

Breathing

If a Langan employee or other personnel breathe in hydrogen sulfide, immediately get the exposed person to fresh air. If breathing has stopped, artificial respiration should be started. Call for medical assistance or a doctor as soon as possible.

Safety Precautions

Hydrogen sulfide is a highly flammable gas and a dangerous fire hazard. Containers of hydrogen sulfide may explode in a fire situation. Poisonous gases are produced during fires.

Langan employees should contact property owners and operators prior to conducting work onsite to be aware of any site-specific contingency plans, identify where hydrogen sulfide is used at the facility, and be informed about additional safety rules or procedures.

17.3.4 Fire Protection/Extinguishers

Langan field personnel that have been provided with portable fire extinguishers for use at worksites will be trained to familiarize employees with general principles of fire extinguisher use and hazards associated with the incipient stage of firefighting. Training will be provided prior to the initial assignment for field work and annually thereafter.

Portable fire extinguishers must be visually inspected monthly and subjected to an annual maintenance check. Langan will retain records of the annual maintenance date.

17.3.5 Overhead lines

When field work is performed near overhead lines, the lines must be de-energized and grounded, or other protective measures must be provided before the work commences. If overhead lines are to be de-energized, arrangements must be made with the client, property owner, or organization that operates or controls the electric circuits involved to de-energize and ground them. If protective measures, such as guarding, isolating, or insulating, are provided, these precautions must prevent employees from contacting such lines directly with any part of their body or indirectly through conductive materials, tools, or equipment.

When unqualified Langan personnel are working in an elevated position near overhead lines, the location must be such that the person and the longest conductive object they may contact cannot come closer to any unguarded, energized overhead line than the following distances:

1. For voltages to ground 50 kilovolts (kV) or below - 10 feet; and
2. For voltages to ground over 50kV - 10 feet, plus 4 inches for every 10kV over 50kV.

As previously indicated, Langan does not retain qualified employees to perform work on energized equipment.

17.3.5.1 Vehicle and Equipment Clearance

Any vehicle or mechanical equipment capable of having parts of its structure elevated near energized overhead lines must be operated so that a clearance of 10 feet is maintained. If the voltage of the overhead lines is higher than 50kV, the clearance must be increased by 4 inches for every 10kV over that voltage.

If any of the following discussed conditions occur, the clearance may be reduced.

- If the vehicle is in transit with its structure lowered, the clearance may be reduced to 4 ft. If the voltage is higher than 50kV, the clearance must be increased to 4 inches for every 10 kV over that voltage.
- If insulating barriers are installed to prevent contact with the lines, and if the barriers are rated for the voltage of the line being guarded and are not a part of or an attachment to the vehicle or its raised structure, the clearance may be reduced to a distance within the designed working dimensions of the insulating barrier.

Employees standing on the ground may not contact the vehicle or mechanical equipment or any of its attachments unless the employee is using protective equipment rated for the voltage, or the equipment is located so that no uninsulated part of its structure (that portion of the structure that provides a conductive path to employees on the ground) can come closer to the overhead line than permitted.

If any vehicle or mechanical equipment capable of having parts of its structure elevated near energized overhead lines is intentionally grounded, employees working on the ground near the point of grounding may not stand at the grounding location whenever there is a possibility of overhead line contact. Additional precautions, such as the use of barricades or insulation, must be taken to protect employees from hazardous ground potentials, depending on earth resistivity and fault currents, which can develop within the first few feet or more outward from the grounding point.

17.3.6 Trade Secret

Langan employees could potentially be provided trade secret information by the client or property owner when site-specific information is provided about highly hazardous chemicals. Trade secret means any confidential formula, pattern, process, device, information, or compilation of information that is used in an employer's business, and that allows the employer to obtain an advantage over competitors who do not know or use it. Langan employees understand that this information should be kept confident and if required, may enter into a confidentiality agreement with the client.

17.3.7 Bloodborne Pathogens

Langan employees that can anticipate exposure to blood or other potentially infectious material while at work sites must have training in bloodborne pathogens. Applicable employees would include those trained in first aid and serving a designated role as an emergency medical care provider. Bloodborne pathogens are pathogenic microorganisms that are present in human blood and can cause disease in humans. These pathogens include but are not limited to, hepatitis B virus and human immunodeficiency virus.

17.3.7.1 Training

Langan employees with potential occupational exposure to blood or other potentially infectious material must participate in a training program. Training must be conducted prior to the initial assignment where there would be potential for exposure and annually thereafter within one year of previous training. The training program will be provided to Langan employees at no cost to them and during working hours.

Langan will ensure the training program must consist of the following:

- An accessible copy of the regulatory text of 29 CFR 1910.1030 and an explanation of its contents.
- A general explanation of the epidemiology and symptoms of bloodborne diseases.
- An explanation of the modes of transmission of bloodborne pathogens.
- An explanation of Langan's exposure control plan and how the employee can obtain a copy of the written plan.
- An explanation of the appropriate methods for recognizing tasks and other activities that may involve exposure to blood and other potentially infectious materials.
- An explanation of the use and limitations of personal protective equipment (PPE) to prevent and reduce exposure.
- Information on the types, proper use, location, removal, handling, and disposal of PPE.

- An explanation of the basis for the selection of PPE.
- Information on the hepatitis B vaccine, including information on its efficacy, safety, method of administration, the benefits of being vaccinated, and that the vaccine and vaccination will be offered free of charge.
- Information on the appropriate actions to take and persons to contact in an emergency involving blood or other potentially infectious materials.
- An explanation of the procedure to follow if an exposure incident occurs, including the method of reporting the incident and the medical follow-up that will be made available.
- Information on the post-exposure evaluation and determining whether the employer is required to provide for the employee following an exposure incident.
- An explanation of the signs and labels and/or color coding required by paragraph 29 CFR 1910.1030(g)(1); and
- An opportunity for interactive questions and answers with the person conducting the training session.

Langan will develop and implement a written Exposure Control Plan, which will be designed to eliminate or minimize employee exposure to bloodborne pathogens. The Exposure Control Plan will contain the following elements:

- An exposure determination for employees.
- The schedule and method of implementation for Methods of Compliance (29 CFR 191.1030(d)), Hepatitis B Vaccination and Post-Exposure Evaluation and Follow-up (29 CFR 1910.1030(f)), Communication of Hazards to Employees (29 CFR 1910.1030(g)) and (h) Recordkeeping (29 CFR 1910.1030(h)).
- The procedure for the evaluation of circumstances surrounding exposure incidents.
- Ensure a copy of the Exposure Control Plan will be accessible to employees; and,
- The Exposure Control Plan must be reviewed and updated at least annually.

Langan employees with occupational exposure to bloodborne pathogens include any employees trained in first aid that would be expected to provide emergency medical care. This determination is made without regard to the use of PPE, which could eliminate or minimize exposure.

Universal precautions must be observed to prevent contact with blood or other potentially infectious materials. According to the concept of Universal Precautions, all human blood and certain human body fluids are treated as if known to be infectious for bloodborne pathogens. Under circumstances in which differentiation between body fluid types is difficult or impossible, all body fluids must be considered potentially infectious materials.

Work practice controls must be used to eliminate or minimize employee exposure, if applicable. Since Langan employees will have occupational exposure only during the rendering of first aid,

personnel protective equipment will be utilized to reduce or minimize exposure. PPE that could be available to Langan personnel when administering first aid includes safety glasses, gloves, and Tyvek suits or sleeves. PPE and first aid kits will be provided to employees at no cost to them.

Langan employees that render first aid in office areas will have access to hand-washing facilities or restrooms. For first aid rendered at field locations, first aid kits will contain an appropriate antiseptic hand cleanser and clean cloth/paper towels or antiseptic towelettes. After using antiseptic hand cleansers or towelettes, employees must wash their hands with soap and running water as soon as feasible.

After administering first aid, potentially infectious materials, including towels, personnel protective equipment, clothes, and bandages, must be placed in a container, which prevents leakage during collection, handling, processing, storage, transport, or shipping. All PPE will be disposed of after use. Any equipment or working surfaces which was been exposed to blood or potentially infectious materials due to an injury will be decontaminated prior to reuse.

Langan will make available the hepatitis B vaccine and vaccination series to all employees who have occupational exposure, and post-exposure evaluation and follow-up to all employees who have had an exposure incident. These services will be available to the employee at no cost to them through a medical provider.

17.3.7.2 Recordkeeping

Langan will maintain training and medical records for each employee with occupational exposure to blood or potentially infectious materials. Medical and training records will be maintained by Langan's H&S Department.

Training records will include the following:

- Dates of the training sessions.
- Contents or a summary of the training sessions.
- Names and qualifications of persons conducting the training; and
- Names and job titles of all persons attending the training sessions.

Training records must be maintained for 3 years from the date on which the training occurred. Medical records will be preserved and maintained for the duration of employment plus 30 years.

All records will be made available upon request to employees, the Assistant Secretary of Labor for Occupational Safety and Health, and the Director of the National Institute for Occupational

Safety and Health Director of OSHA for examination and copying. Medical records must have written consent from the employee before releasing.

If Langan ceases to do business, all records must be transferred to the successor employer. The successor employer must receive and maintain these records.

If there will not be a successor, Langan will notify current employees of their rights to access records at least three months prior to the cessation of business.

18.0 RECORDKEEPING

The following is a summary of required health and safety logs, reports, and recordkeeping.

18.1 Field Change Authorization Request

Any changes to the work to be performed that are not included in the CHASP will require an addendum that is approved by the Langan project manager and Langan HSM to be prepared. Approved changes will be reviewed with all field personnel at a safety briefing.

18.2 Medical and Training Records

Copies or verification of training (40-hour, 8-hour, supervisor, site-specific training, documentation of three-day on-the-job training (OJT)), and respirator fit-test records) and medical clearance for site work and respirator use will be maintained in the office and available upon request. Records for all subcontractor employees must also be available upon request. All employee medical records will be maintained by the HSM.

18.3 Onsite Log

A log of personnel on-site each day will be kept by the HSO or designee.

18.4 Daily Safety Meetings ("Tailgate Talks")

Completed safety briefing forms will be maintained by the HSO.

18.5 Exposure Records

All personal monitoring results, laboratory reports, calculations, and air sampling data sheets are part of an employee exposure record. These records will be maintained by the HSO during site work. At the end of the project, they will be maintained according to 29 CFR 1910.1020.

18.6 Hazard Communication Program/MSDS-SDS

Material safety data sheets (MSDS) Safety Data Sheets (SDS) have been obtained for applicable substances and are included in this CHASP (Attachment D). Langan's written hazard communication program, in compliance with 29 CFR 1910.1200, is maintained by the HSM.

18.7 Documentation

Immediately following an incident or near miss, unless emergency medical treatment is required, either the employee or a coworker must contact the Langan incident/injury hotline at 1-800-952-6426, extension 4699, and the Project Manager to report the incident or near miss. The Project Manager will contact the client or client representative. A written report must be completed and submitted HSM within 24 hours of the incident. For emergencies involving personnel injury and/or exposure, the employee will complete and submit the Langan incident/injury report to the Langan corporate health and safety manager as soon as possible following the incident. Accidents will be investigated in-depth to identify all causes and to recommend hazard control measures.

18.7.1 Accident and Injury Report Forms

18.7.1.1 Accident/Incident Report

All injuries, no matter how slight, must be reported to the FTL and the PM immediately. The accident/incident report forms, attached in Attachment C, will be filled out on all accidents by the applicable contractor supervision personnel, the FTL, or the HSO. Copies of all accident/incident reports must be kept on-site and available for review. Project personnel will be instructed on the location of the first aid station, hospital, and doctor and ambulance service near the job. The emergency telephone numbers will be conspicuously posted in site vehicles near the work zone. First aid supplies will be centrally located and conspicuously posted between restricted and nonrestricted areas to be readily accessible to all on the site.

18.7.1.2 First Aid Treatment Record

The forms will be used for recording all non-lost time injuries treated by the project first-aid attendant, the local physician or hospital will be entered in detail on this record. "Minor" treatment of scratches, cuts, etc. will receive the same recording attention as treatment of more severe injuries.

18.7.1.3 OSHA Form 300

An OSHA Form 300 will be kept at the Langan Corporate Office in Parsippany, New Jersey. All recordable injuries or illnesses will be recorded on this form. Subcontractor employers must also meet the requirements of maintaining an OSHA 300 form. The Incident Report form used to capture the details of work-related injuries/illnesses meets the requirements of the OSHA Form 301 (supplemental record) and must be maintained with the OSHA Form 300 for all recordable injuries or illnesses. Forms for recording OSHA work-related injuries and illnesses are included in Attachment C.

19.0 CONFINED SPACE ENTRY

Confined spaces are not anticipated at the Site during planned construction activities. If confined spaces are identified, the contractor must implement their own confined space program that all applicable federal, state, and local regulations. Confined spaces **will not** be entered by Langan personnel.

20.0 CHASP ACKNOWLEDGEMENT FORM

All Langan personnel and contractors will sign this CHASP Compliance Agreement indicating that they have become familiar with this CHASP and that they understand it and agree to abide by it.

Printed Name	Signature	Company	Date

Printed Name	Signature	Company	Date

Printed Name	Signature	Company	Date

TABLES

TABLE 1
TASK HAZARD ANALYSES

Task	Hazard	Description	Control Measures	First Aid
1.3.1 – 1.3.22	Contaminated Soil or Groundwater-Dermal Contact	Contaminated water spills on skin, splashes in eyes; contact with contaminated soil/fill during construction activities or sampling.	Wear proper PPE; follow safe practices, maintain safe distance from construction activities	See Table 2, seek medical attention as required
1.3.1 – 1.3.22	Lacerations, abrasions, punctures	Cutting bailer twine, pump tubing, acetate liners, etc. with knife; cuts from sharp site objects or previously cut piles, tanks, etc.; Using tools in tight spaces	Wear proper PPE; follow safe practices	Clean wound, apply pressure and/or bandages; seek medical attention as required.
1.3.1 – 1.3.22	Contaminated Media Inhalation	Opening drums, tanks, wells; vapors for non-aqueous phase liquids or other contaminated site media; dust inhalation during excavation; vapor accumulation in excavation	Follow air monitoring plan; have quick access to respirator, do not move or open unlabeled drums found at the site, maintain safe distance from construction activities	See Table 2, seek medical attention as required
1.3.1 – 1.3.22	Lifting	Improper lifting/carrying of equipment and materials causing strains	Follow safe lifting techniques. Langan employees are not to carry contractor equipment or materials	Rest, ice, compression, elevation; seek medical attention as required
1.3.1 – 1.3.22	Slips, trips, and falls	Slips, trips, and falls due to uneven surfaces, cords, steep slopes, debris, and equipment in work areas	Good housekeeping at site; constant awareness and focus on the task; avoid climbing on stockpiles; maintain safe distance from construction activities and excavations; avoid elevated areas over six feet unless fully accredited in fall protection and wearing an approved fall protection safety apparatus	Rest, ice, compression, elevation; seek medical attention as required
1.3.1 – 1.3.22	Noise	Excavation equipment, hand tools, drilling equipment.	Wear hearing protection; maintain safe distance from construction activities	Seek medical attention as required
1.3.1 – 1.3.22	Falling objects	Soil material, tools, etc. dropping from drill rigs, front-end loaders, etc.	Hard hats to be worn at all times while in work zones; maintain safe distance from construction activities and excavations	Seek medical attention as required
1.3.1 – 1.3.22	Underground/ overhead utilities	Excavation equipment, drill rig auger contacts underground object; boom touches overhead utility	"One Call" before dig; follow safe practices; confirm utility locations with contractor; wear proper PPE; maintain safe distance from construction activities and excavations	Seek medical attention as required
1.3.1 – 1.3.22	Insects (bees, wasps, hornet, mosquitoes, and spider)	Sings, bites	Insect Repellent; wear proper protective clothing (work boots, socks, and light-colored pants); field personnel who may have insect allergies (e.g., bee sting) should provide this information to the HSO or FSO prior to commencing work and will have allergy medication on site.	Seek medical attention as required
1.3.1 – 1.3.22	Vehicle traffic / Heavy Equipment Operation	Vehicles unable to see workers on site, operation of heavy equipment in tight spaces, equipment failure, malfunctioning alarms	Wear proper PPE, especially visibility vest; use a buddy system to look for traffic; rope off area of work with cones and caution tape or devices at points of hazard, maintain safe distance from construction activities and equipment	Seek medical attention as required

TABLE 2
CONTAMINANT HAZARDS OF CONCERN

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	1,1,2-Trichloroethane 1,1,2-TCA 1,1,2-Trichloroethane Ethane trichloride β-Trichloroethane Vinyl trichloride	79-00-5	PID	10 ppm 100 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation eyes, nose; central nervous system depression; liver, kidney damage; dermatitis	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention
1.3.1 – 1.3.22	1,1'-Biphenyl 1,1-Biphenyl Biphenyl Phenyl benzene Diphenyl	92-52-4	None	1 mg/m^3 100 mg/m^3	Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, throat; headache, nausea, lassitude (weakness, exhaustion), numb limbs; liver damage	Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	1,2,4-Trichlorobenzene Unsym-Trichlorobenzene 1,2,4-Trichlorobenzol	120-82-1	NA	None None	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation eyes, skin, mucous membrane; In Animals: liver, kidney damage; possible teratogenic effects	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	1,2,4-Trimethylbenzene	95-63-6	PID	None None	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat, respiratory system; bronchitis; hypochromic anemia; headache, drowsiness, lassitude (weakness, exhaustion), dizziness, nausea, incoordination; vomiting, confusion; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	1,2-Dibromo-3-chloropropane Dibromochloropropane DBCP	96-12-8	PID	None None	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation eyes, skin, nose, throat; drowsiness; nausea, vomiting; pulmonary edema; liver, kidney injury; sterility; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	1,2-Dichlorobenzene	95-50-1	PID	50 ppm 200 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eye, swelling periorbital (situated around the eye); profuse rhinitis; headache, anorexia, nausea, vomiting; weight loss, jaundice, cirrhosis; in animals: liver, kidney injury; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	1,2-Dichlorotetrafluoroethane Dichlorotetrafluorethane 1,2-Dichloro-1,1,2,2-tetrafluoroethane Freon® 114 Freon 114 Genetron® 114 Halon® 242 Refrigerant 114 1,2-Dichloro-1,1,2,2-tetrafluorethane	76-14-2	PID	1000 ppm 15000 ppm	Groundwater Soil Vapor	inhalation, skin, and/or eye contact (liquid)	irritation respiratory system; asphyxia; cardiac arrhythmias, cardiac arrest; liquid: frostbite	Eye: Frostbite Skin: Frostbite Breathing: Respiratory support
1.3.1 – 1.3.22	1,2-Diphenylhydrazine Hydrazobenzène Diphénylhydrazine N,N'-Bianiline	122-66-7	NA	NA NA	Groundwater Soil	Inhalation, ingestion, skin, and/or eye contact	Irritant to eyes, skin, mucous membranes, and respiratory system. May be harmful by ingestion, skin absorption and inhalation	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	1,3,5-Trimethylbenzene Mesitylene sym-Trimethylbenzene	108-67-8	PID	None None	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat, respiratory system; bronchitis; hypochromic anemia; headache, drowsiness, lassitude (weakness, exhaustion), dizziness, nausea, incoordination; vomiting, confusion; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	1,3-Butadiene Biethylene Bivinyl Butadiene Divinyl Erythrene Vinylethylene	106-99-0	PID	1 ppm 2000 ppm	Vapor	inhalation, skin, and/or eye contact (liquid)	irritation to the eyes, nose, throat; drowsiness, dizziness; liquid: frostbite; teratogenic, reproductive effects; [potential occupational carcinogen]	Eye: Frostbite Skin: Frostbite Breathing: Respiratory support

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	1,3-Dichlorobenzene m-Dichlorobenzol; m-Phenylene dichloride m-dichlorobenzene	541-73-1	PID	None None	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, swelling periorbital (situated around the eye); profuse rhinitis; headache, anorexia, nausea, vomiting; weight loss, jaundice, cirrhosis; in animals: liver, kidney injury; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	1,4-Dichlorobenzene para-Dichlorobenzene p-Dichlorobenzene 1,4-Dichlorobenzene 1,4-DCB para-Dichlorobenzene p-Dichlorobenzene p-DCB PDB Paramoth Para crystals Paracide Dichlorocide	106-46-7	PID	75 ppm 150 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, swelling periorbital (situated around the eye); profuse rhinitis; headache, anorexia, nausea, vomiting; weight loss, jaundice, cirrhosis; in animals: liver, kidney injury; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	1,4-Dioxane 1,4-Dioxacyclohexane [1,4]Dioxane p-Dioxane [6]-crown-2 Diethylene dioxide Diethylene ether Dioxan Dioxane 1,4-Dioxane	123-91-1	PID	100 ppm 500 ppm	Groundwater Soil Vapor	Inhalation, ingestion, skin, and/or eye contact	Irritant to eyes, skin, mucous membranes, and respiratory system. May be harmful by ingestion, skin absorption and inhalation	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	2-(N-Methylperfluorooctanesulfonamido)acetic acid N-MeFOSAA N-methylperfluorooctane sulfonamidoacetic acid 2-(N-methyl-perfluorooctane sulfonamido) acetic acid Glycine N-[(heptadecafluorooctyl)sulfonyl]-N-methyl- N-methyl perfluorooctane-sulfonamidoacetic acid NMeFOSAA MeFOSAA	2355-31-9	NA	NA NA	Groundwater Soil	inhalation, skin, or eye contact, ingestion	irritation to eyes with eye damage, skin, causing rash, redness or burning, irritation to nose, throat, and lungs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	2,4-Dimethylphenol 2,4-Xylenol m-Xylenol 1-Hydroxy-2,4-dimethylbenzene 2,4-Dimethylphenol 4-Hydroxy-1,3-dimethylbenzene 4,6-Dimethylphenol 1,3-Dimethyl-4-hydroxybenze	105-67-9	None	NA NA	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, mucous membrane; headache, narcosis, coma; dermatitis; in animals: liver, kidney damage	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	2,6-Dinitrotoluene 2-Methyl-1,3-dinitrobenzene 2,6-DNT 2-methyl-1,3-dinitrobenzene 1-Methyl-2,6-dinitrobenzene 2,4-dinitromethylbenzene	606-20-2	PID	1.5 mg/m3	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	headache, weakness, nausea or dizziness, affect the nervous system causing fatigue, nausea, vomiting, drowsiness, and personality changes (irritability, anxiety, confusion and depression); shortness of breath and collapse. Can burn eyes and skin.	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	2-Butanone Ethyl methyl ketone MEK Methyl acetone Methyl ethyl ketone	78-93-3	PID	200 ppm 3000 ppm	Soil Groundwater Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose; headache; dizziness; vomiting; dermatitis	Eye: Irrigate immediately Skin: Water wash immediately Breathing: Fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.22	2-Hexanone Butyl methyl ketone MBK Methyl butyl ketone Methyl n-butyl ketone	591-78-6	PID	100 ppm 1600 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, nose; peripheral neuropathy: lassitude (weakness, exhaustion), paresthesia; dermatitis; headache, drowsiness	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	2-Methylnaphthalene β-methylnaphthalene	91-57-6	PID	NA NA	Groundwater Soil Vapor	inhalation, ingestion or skin, absorption, eye contact	irritation to the skin, eyes, mucous membranes, and upper respiratory tract. It may also cause headaches, nausea, vomiting, diarrhea, anemia, jaundice, euphoria, dermatitis, visual disturbances, convulsions and comatose	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	4,4′-DDD Dichlorodiphenyldichloroethane 1,1'-(2,2-Dichloroethylidene)bis (4-chlorobenzene) p,p'-DDD	72-54-8	None	NA NA	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin; paresthesia tongue, lips, face; tremor; anxiety, dizziness, confusion, malaise (vague feeling of discomfort), headache, lassitude (weakness, exhaustion); convulsions; paresis hands; vomiting; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	4-Isopropyltoulene 1-Methyl-4-(1-methylethyl)benzene 4-Isopropyltoluene; 4-Methylcumene; 1-Methyl-4-isopropylbenzene Dolcymene Camphogen Paracymene Cymene p-Cymene p-Isopropyltoluene	99-87-6	PID	NA NA	Soil Groundwater Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, mucous membrane; dermatitis; headache, narcosis, coma	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	4-Methyl-2-pentanone Hexone Isobutyl methyl ketone Methyl isobutyl ketone MIBK	108-10-1	PID	100 ppm 500 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, mucous membrane; headache, narcosis, coma; dermatitis; in animals: liver, kidney damage	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Acenaphthene 1,2-Dihydroacenaphthylene 1,8-Ethylenenaphthalene peri-Ethylenenaphthalene Naphthyleneethylene Tricyclododecapentaene	83-32-9	PID	NA NA	Soil	inhalation, ingestion, skin, and/or eye contact,	irritation to the skin, eyes, mucous membranes, and upper respiratory tract; If ingested, it can cause vomiting	Eye: Irrigate immediately Skin: Soap wash immediately, if redness or irritation develop, seek medical attention immediately Breathing: Move to fresh air Swallow: do not induce vomiting, seek medical attention immediately
1.3.1 – 1.3.22	Acenaphthylene Cycopental(de)naphthalene, Acenaphthalene	208-96-8	PID	NA NA	Soil	inhalation, ingestion, skin, and/or eye contact	irritation to the skin, eyes, mucous membranes, and upper respiratory tract	Eye: Irrigate immediately, seek medical attention immediately, Skin: Soap wash immediately, if redness or irritation develop, seek medical attention immediately Breathing: Move to fresh air Swallow: do not induce vomiting, seek medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Acetone Dimethyl ketone Ketone propane 2-Propanone	67-64-1	PID	1000 ppm 2500 ppm	Groundwater Soil	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, nose, throat; headache, dizziness, central nervous system depression; dermatitis	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Aldrin 1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-hexahydro-endo-1,4-exo-5,8-dimethanonaphthalene HHDN Octalene	309-00-2	PID	0.25 ppm 5 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	headache, dizziness; nausea, vomiting, malaise (vague feeling of discomfort); myoclonic jerks of limbs; colonic, tonic convulsions; coma; hematuria (blood in the urine), azotemia; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Alpha-Chlordane Alpha Chlordane a-Chlordane	5103-71-9	None	0.5 mg/m^3 100 mg/m^3	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	Blurred vision; confusion; ataxia, delirium; cough; abdominal pain, nausea, vomiting, diarrhea; irritability, tremor, convulsions; anuria	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Aluminum	7429-90-5	None	0.5 mg/m3 50 mg/m3	Soil	inhalation, skin, and/or eye contact	irritation to the eyes, skin, respiratory system	Eye: Irrigate immediately Breathing: Fresh air

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Anthracene	120-12-7	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Soil	inhalation, skin, or eye contact, ingestion	irritation to the skin, eyes, mucous membranes, and upper respiratory tract, abdominal pain if ingested.	Eye: Irrigate immediately, seek medical attention immediately, Skin: Soap wash immediately, Breathing: Move to fresh air, refer to medical attention. Swallow: refer to medical attention
1.3.1 – 1.3.22	Antimony	7440-36-0	None	0.5 mg/m^3 50 mg/m^3	Groundwater Soil	inhalation, ingestion, skin, and/or eye contact	irritation skin, dermatitis; resp distress; diarrhea; muscle tremor, convulsions; possible gastrointestinal tract	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Aroclor 1242	53469-21-9	None	0.5 mg/m^3 5 mg/m^3	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, chloracne	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Aroclor 1248	12672-26-6	None	0.5 mg/m^3 5 mg/m^3	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, chloracne	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Aroclor 1254	11097-69-1	None	0.5 mg/m^3 5 mg/m^3	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, chloracne	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Aroclor 1260	11096-82-5	None	0.5 mg/m^3 5 mg/m^3	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, chloracne	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Arsenic	NA	None	0.5 mg/m^3 NA	Groundwater Soil	inhalation, ingestion, skin, and/or eye contact	irritation skin, dermatitis; resp distress; diarrhea; muscle tremor, convulsions; possible gastrointestinal tract	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Barium	10022-31-8	None	0.5 mg/m^3 50 mg/m^3	Groundwater Soil	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, upper respiratory system; skin, burns; gastroenteritis; muscle spasm; slow pulse	Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Benzene Benzol Phenyl hydride Alkyl benzene isomers	71-43-2	PID	3.19 mg/m^3 1,595 mg/mg^3	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait; lassitude (weakness, exhaustion) [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Benzo(a)anthracene Benzanthracene Benzanthrene 1,2-Benzanthracene Benzo[b]phenanthrene Tetraphene	56-55-3	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Groundwater Soil	inhalation, skin, or eye contact, ingestion	dermatitis, bronchitis, [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Benzo(a)pyrene	50-32-8	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Soil	inhalation, skin, or eye contact, ingestion	dermatitis, bronchitis, [potential occupational carcinogen]	Eye: Irrigate immediately, seek medical attention Skin: Soap wash immediately. Breathing: move to fresh air. Swallow: Induce vomiting if conscious, seek medical attention immediately
1.3.1 – 1.3.22	Benzo(b)fluoranthene	205-99-2	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Soil	inhalation, skin, or eye contact, ingestion	irritation to eyes and skin, respiratory irritation (dizziness, weakness, fatigue, nausea, headache)	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.22	Benzo(g,h,i)perylene Benzo(ghi)perylene	191-24-2	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Soil	inhalation, skin, or eye contact, ingestion	irritation to eyes and skin, respiratory irritation (dizziness, weakness, fatigue, nausea, headache)	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Benzo(k)fluoranthene	207-08-9	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Soil	inhalation, skin, or eye contact, ingestion	irritation to eyes and skin, respiratory irritation (dizziness, weakness, fatigue, nausea, headache)	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.22	Benzyl butyl phthalate Butyl benzyl phthalate Butylbenzylphthalate	86-66-7	None	NA NA	Groundwater Soil Vapor	inhalation, skin, or eye contact, ingestion	irritation to eyes and skin, respiratory irritation (dizziness, weakness, fatigue, nausea, headache	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.22	Beryllium	7440-41-7	None	0.002 mg/m^3 4 mg/m^3	Soil	inhalation, skin, and/or eye contact	berylliosis (chronic exposure): anorexia, weight loss, lassitude (weakness, exhaustion), chest pain, cough, clubbing of fingers, cyanosis, pulmonary insufficiency; irritation to the eyes; dermatitis; [potential occupational carcinogen]	Eye: Irrigate immediately Breathing: Fresh air

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Beta-Endosulfan Beta Endosulfan Endosulfan II (beta) Endosulfan II	33213-65-9	None	None	NA NA	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation skin; nausea, confusion, agitation, flushing, dry mouth, tremor, convulsions, headache; in animals: kidney, liver injury; decreased testis weight
1.3.1 – 1.3.22	Bis(2-ethylhexyl)phthalate Bis(2-Ethylhexyl) Phthalate Di-sec octyl phthalate DEHP Di(2-ethylhexyl)phthalate Octyl phthalate bis(2-ethylexyl)phthalate	117-81-7	None	5 mg/m^3 5000 mg/m^3	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, mucous membrane; in animals: liver damage; teratogenic effects; [potential occupational carcinogen	Eye: Irrigate immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Bromodichloromethane Dichlorobromomethane Bromo(dichloro)methane	75-27-4	NA	NA NA	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, upper respiratory system, stomach	Eye: Irrigate immediately Skin: Wash regularly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Cadmium	7440-43-9	None	0.005 mg/m^3 9 mg/m^3	Soil	inhalation, ingestion	pulmonary edema, dyspnea (breathing difficulty), cough, chest tightness, substernal (occurring beneath the sternum) pain; headache; chills, muscle aches; nausea, vomiting, diarrhea; anosmia (loss of the sense of smell), emphysema, proteinuria, mild anemia; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Calcium	7440-70-2	None	NA	Groundwater Soil	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, upper resp tract; ulcer, perforation nasal septum; pneumonitis; dermatitis	Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Chlorobenzene benzene chloride monochlorobenzene Phenyl chloride Chlorobenzol MCB	108-90-7	PID	75 ppm 1000 ppm	Groundwater Soil Vapor	inhalation, skin, or eye contact, ingestion	irritation to the eyes, skin, nose; drowsiness, incoordination; central nervous system depression; in animals: liver, lung, kidney injury	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Chloroform Methane trichloride Trichloromethane Chloro-3-methyl phenol	67-66-3	None	50 ppm 500 ppm	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin; dizziness, mental dullness, nausea, confusion; headache, lassitude (weakness, exhaustion); anesthesia; enlarged liver; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Chromium Total Chromium Chromium, Total	7440-47-3	None	1.0 mg/m^3 250 mg/m^3	Groundwater Soil	inhalation absorption ingestion	irritation to eye, skin, and respiratory	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Chrysene Benzo[a]phenanthrene 1,2-Benzphenanthrene	218-01-9	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Groundwater Soil	inhalation, absorption, ingestion, consumption	irritation to eye, skin, and respiratory, gastrointestinal irritation nausea, vomit, diarrhea [potential occupational carcinogen]	Eyes: Irrigate immediately Skin: Soap wash promptly. Breath: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	cis-1,2-Dichloroethylene cis-1,2-Dichloroethene	156-59-2	NA	NA NA	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	Irritant to eyes, skin, mucous membranes, and respiratory system. May be harmful by ingestion, skin absorption and inhalation	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Cobalt	7440-48-4	None	0.1mg/m^3 20 mg/m^3	Soil	inhalation, ingestion, skin, and/or eye contact	Cough, dyspnea (breathing difficulty), wheezing, decreased pulmonary function; weight loss; dermatitis; diffuse nodular fibrosis; resp hypersensitivity, asthma	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Copper	7440-50-8	None	1.0 mg/m^3 100 mg/m^3	Groundwater Soil	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, nose, metallic taste; dermatitis; anemia	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Cumene Cumol Isopropylbenzene 2-Phenyl propane 1-methylethy lbenzene Isopropyl Benzene	98-82-8	PID	50 ppm 900 ppm	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, mucous membrane; dermatitis; headache, narcosis, coma	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Cyanide	57-12-5	None	5 mg/m^3 25 mg/m^3	Groundwater Soil	inhalation, ingestion, skin, and/or eye contact	Exposure to cyanide can cause weakness, headaches, confusion, dizziness, fatigue, anxiety, sleepiness, nausea and vomiting. Breathing can speed up then become slow and gasping. Coma, and convulsions also occur. If copious amounts of cyanide have been absorbed by the body, the person usually collapses, and death can occur very quickly. Long-term exposure to lower levels of cyanide can cause skin, and nose irritation, itching, rashes and thyroid changes.	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Cyclohexane Benzene hexahydride Hexahydrobenzene Hexamethylene Hexanaphthene	110-82-7	PID	300 ppm 1300 ppm	Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, respiratory system; drowsiness; dermatitis; narcosis, coma	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	DDE 4,4-DDE 4,4′-DDE 1,1-bis-(4-chlorophenyl)-2,2-dichloroethene Dichlorodiphenyldichloroethylene p,p'-DDE	72-55-9	None	NA NA	Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	Oral ingestion of food is the primary source of exposure for the general population. Acute and chronic ingestion may cause nausea, vomiting, diarrhea, stomach pain, headache, dizziness, disorientation, tingling, sensation, kidney damage, liver damage, convulsions, coma, and death. 4,4' DDE may cross the placenta and can be excreted in breast milk	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	DDT 4,4-DDT 4,4′-DDT p,p′-DDT Dichlorodiphenyltrichloroethane 1,1,1-Trichloro-2,2-bis(p-chlorophenyl)ethane	50-29-3	None	1 mg/m^3 500 mg/m^3	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin; paresthesia tongue, lips, face; tremor; anxiety, dizziness, confusion, malaise (vague feeling of discomfort), headache, lassitude (weakness, exhaustion); convulsions; paresis hands; vomiting; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Dibenz(a,h)anthracene Dibenzo(a,h)anthracene Dibenzo[a,h]anthracene	53-70-3	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Groundwater Soil	inhalation, absorption, ingestion, consumption	irritation to eyes, skin, respiratory, and digestion [potential occupational carcinogen]	Eyes: Irrigate immediately Skin: Soap wash promptly. Breath: Respiratory support PID Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Dibenzofuran	132-64-9	None	NA NA	Soil	inhalation, absorption	irritation to eyes, and skin	Eyes: Irrigate immediately Skin: Soap wash promptly.
1.3.1 – 1.3.22	Dibutyl phthalate Di-n-butyl phthalate Butyl phthalate n-Butyl phthalate 1,2-Benzenedicarboxylic acid dibutyl ester o-Benzenedicarboxylic acid dibutyl ester DBP Palatinol C, Elaol Dibutyl-1,2-benzene-dicarboxylate Di-n-butylphthalate	84-74-2	None	5 mg/m^3 4000 mg/m^3	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, upper respiratory system, stomach	Eye: Irrigate immediately Skin: Wash regularly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Dichlorodifluoromethane Difluorodichloromethane, Fluorocarbon 12 Freon 12 Freon® 12 Genetron® 12 Halon® 122 Propellant 12 Refrigerant 12 Dichlorodifluromethane	75-71-8	None	1000 pp, 15,000 ppm	Groundwater Soil Vapor	inhalation, skin, and/or eye contact (liquid)	dizziness, tremor, asphyxia, unconsciousness, cardiac arrhythmias, cardiac arrest; liquid: frostbite	Eye: Frostbite Skin: Frostbite Breathing: Respiratory support
1.3.1 – 1.3.22	Dieldrin HEOD 1,2,3,4,10,10-Hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4-endo exo-5,8-dimethanonaphthalene	60-57-1	PID	0.25 mg/m^3 50 mg/m^3	Groundwater Soil Water	inhalation, skin absorption, ingestion, skin, and/or eye contact	headache, dizziness; nausea, vomiting, malaise (vague feeling of discomfort), sweating; myoclonic limb jerks; colonic, tonic convulsions; coma; [potential occupational carcinogen]; in animals: liver, kidney damage	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Diesel Fuel automotive diesel fuel oil No. 2 distillate diesoline diesel oil diesel oil light diesel oil No. 1-D summer diesel	68334-30-5	PID	NA NA	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat; burning sensation in chest; headache, nausea, lassitude (weakness, exhaustion), restlessness, incoordination, confusion, drowsiness; vomiting, diarrhea; dermatitis; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Dimethyl phthalate Dimethylphthalate dimethyl benzene-1,2-dicarboxylate	131-11-3	None	5 mg/m3 2000 mg/m3	Groundwater Soil	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, upper respiratory system; stomach pain	Eye: Irrigate promptly Skin: Wash regularly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Di-n-octyl phthalate Di-n-cotylphthalate Di-n-octylphthalate Di-sec octyl phthalate Dioctyl phthalate DEHP, Di(2-ethylhexyl)phthalate, DOP, bis-(2-Ethylhexyl)phthalate, Octyl phthalate	117-84-0	None	5 mg/m^3 5000 mg/m^3	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, mucous membrane; in animals: liver damage; teratogenic effects; [potential occupational carcinogen]	Eye: Irrigate immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Endrin 1,2,3,4,10,10-Hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4-endo,endo-5,8-dimethanonaphthalene; Hexadrin	72-20-8	None	0.1 mg/m^3 2 mg/m^3	Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	epileptiform convulsions; stupor, headache, dizziness; abdominal discomfort, nausea, vomiting; insomnia; aggressiveness, confusion; drowsiness, lassitude (weakness, exhaustion); anorexia; in animals: liver damage	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Ethyl acetate Acetic ester Acetic ether Ethyl ester of acetic acid Ethyl ethanoate	141-78-6	PID	400 ppm 2000 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation eyes, skin, nose, throat; narcosis; dermatitis	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Ethyl benzene Ethylbenzene Ethylbenzol Phenylethane	100-41-4	PID	435 mg/m^3 3,472 mg/m^3	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, mucous membrane; headache; dermatitis; narcosis, coma	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Fluoranthene Benzo(j,k)fluorene	206-44-0	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Groundwater Soil	inhalation, skin, or eye contact, ingestion	irritation to eyes and skin, respiratory irritation (dizziness, weakness, fatigue, nausea, headache)	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.22	Fluorene	86-73-7	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Soil	inhalation, skin, or eye contact, ingestion	irritation to eyes and skin, respiratory irritation (dizziness, weakness, fatigue, nausea, headache)	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention
1.3.1 – 1.3.22	Fuel Oil No. 2	68476-30-2	PID	NA NA	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat; burning sensation in chest; headache, nausea, lassitude (weakness, exhaustion), restlessness, incoordination, confusion, drowsiness; vomiting, diarrhea; dermatitis; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	gamma-Chlordane Gamma Chlordane y-Chlordane	5566-34-7	None	0.5 mg/m^3 100 mg/m^3	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	Blurred vision; confusion; ataxia, delirium; cough; abdominal pain, nausea, vomiting, diarrhea; irritability, tremor, convulsions; anuria	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Gasoline	8006-61-9	PID	NA NA	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, mucous membrane; dermatitis; headache, lassitude (weakness, exhaustion), blurred vision, dizziness, slurred speech, confusion, convulsions; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Helium	7440-59-7	Helium Detector	NA NA	NA	inhalation	dizziness, headache, and nausea	Breathing: Respiratory support
1.3.1 – 1.3.22	Heptachlor	76-44-8	None	0.5 mg/m^3 35 mg/m^3	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	In animals: tremor, convulsions; liver damage; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Heptachlor epoxide 1,4,5,6,7,8,8-Heptachloro-3a,4,7,7a-tetrahydro-4,7-methano-1H-indene	1024-57-3	None	0.5 mg/m^3 35 mg/m^3	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	In animals: tremor, convulsions; liver damage; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Heptane n-Heptane	142-82-5	PID	500 ppm 750 ppm	Goundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	dizziness, stupor, incoordination; loss of appetite, nausea; dermatitis; chemical pneumonitis (aspiration liquid); unconsciousness	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Indeno(1,2,3-cd)pyrene Indeno(1,2,3-c,d)Pyrene Indeno[1,2,3-cd]Pyrene	193-39-5	None	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Groundwater Soil	inhalation, absorption, ingestion, consumption	irritation to eyes, skin, respiratory, and digestion [potential occupational carcinogen]	Eyes: Irrigate immediately Skin: Soap wash promptly. Breath: Respiratory support Swallow: Medical attention immediately, wash mouth with water
1.3.1 – 1.3.22	Iron	7439-89-6	None	10 mg/m^3 NA	Groundwater Soil	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, mucous membrane; abdominal pain, diarrhea, vomiting	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Isopropyl alcohol Iso-Propyl Alcohol Carbinol IPA Isopropanol 2-Propanol sec-Propyl alcohol Rubbing alcohol Isopropylalcohol	67-63-0	PID	400 ppm 2000 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, nose, throat; drowsiness, dizziness, headache; dry cracking skin; in animals: narcosis	Eye: Irrigate immediately Skin: Water flush Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Lead	7439-92-1	None	0.050 mg/m^3 100 mg/m^3	Groundwater Soil	inhalation, ingestion, skin, and/or eye contact	lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation to the eyes; hypertension	Eye: Irrigate immediately Skin: Soap flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Lindane Gamma BHC HCH ã-Hexachlorocyclohexane gamma isomer of 1,2,3,4,5,6-Hexachlorocyclohexane gamma-Hexachlorocyclohexane	58-89-9	None	0.5 mg/m^3 50 mg/m^3	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat; headache; nausea; colonic convulsions; resp difficulty; cyanosis; aplastic anemia; muscle spasm; in animals: liver, kidney damage	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Magnesium	7439-95-4	None	15 mg/m^3 NA	Soil	inhalation, skin, and/or eye contact	irritation to the eyes, skin, respiratory system; cough	Eye: Irrigate immediately Breathing: Fresh air

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Manganese	7439-96-5	None	5 mg/m^3 500 mg/m^3	Groundwater Soil	inhalation, ingestion	aerosol is irritating to the respiratory tract	Eye: Irrigate immediately Skin: Soap flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	m-Cresol meta-Cresol 3-Cresol m-Cresylic acid 1-Hydroxy-3-methylbenzene 3-Hydroxytoluene 3-Methylphenol 3-Methylphenols	108-39-4	PID	5 ppm 250 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, mucous membrane; central nervous system effects: confusion, depression, resp failure; dyspnea (breathing difficulty), irregular rapid respiration, weak pulse; eye, skin, burns; dermatitis; lung, liver, kidney, pancreas damage	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Mercury	7439-97-6	None	0.1 mg/m^3 10 mg/m^3	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Methane Tetrahydridocarbon Carbane Marsh Gas Natural Gas Carbon tetrahydride Hydrogen carbide	74-82-8	PID	NA NA	Groundwater Soil Vapor	inhalation, skin, and/or eye contact (liquid)	dizziness, confusion, excitation, asphyxia; liquid: frostbite	Eye: Frostbite Skin: Frostbite Breathing: Respiratory support
1.3.1 – 1.3.22	Methoxychlor 4,4′-Methoxychlor p,p'-Dimethoxydiphenyltrichloroethane DMDT Methoxy-DDT 2,2-bis(p-Methoxyphenyl)-1,1,1-trichloroethane 1,1,1-Trichloro-2,2-bis-(p-methoxyphenyl)ethane	72-43-5	None	15 mg/m^3 5000 mg/m^3	Groundwater Soil Vapor	inhalation, ingestion	fasciculation, trembling, convulsions; kidney, liver damage; [potential occupational carcinogen]	Skin: Soap wash Breathing: Fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.22	Methyl Acetate	79-20-9	PID	200 ppm 3100 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat; headache, drowsiness; optic nerve atrophy; chest tightness; in animals: narcosis	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Methyl *tert*-butyl ether MTBE Methyl tertiary-butyl ether Methyl t-butyl ether tert-Butyl methyl ether tBME tert-BuOMe Methyl tert butyl ether	1634-04-4	PID	NA NA	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat; burning sensation in chest; headache, nausea, lassitude (weakness, exhaustion), restlessness, incoordination, confusion, drowsiness; vomiting, diarrhea; dermatitis; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Methylcyclohexane Methyl cyclohexane Methylcyclohexane Hexahydrotoluene Cyclohexylmethane Toluene hexahydride	108-87-2	PID	500 ppm 1200 ppm	Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat; dizziness, drowsiness; in animals: narcosis	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Methylene Chloride Dichloromethane Methylene dichloride	75-09-2	PID	25 ppm 2300 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin; lassitude (weakness, exhaustion), drowsiness, dizziness; numb, tingle limbs; nausea; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	m-Xylenes 1,3-Dimethylbenzene m-Xylol Metaxylene	108-38-3 179601-23-1	PID	100 ppm 900 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; nausea, vomiting, abdominal pain; dermatitis	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Naphthalene Naphthalin Tar camphor White tar	91-20-3	PID	50 mg/m^3 250 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes; headache, confusion, excitement, malaise (vague feeling of discomfort); nausea, vomiting, abdominal pain; irritation bladder; profuse sweating; hematuria (blood in the urine); dermatitis, optical neuritis	Eye: Irrigate immediately Skin: Molten flush immediately/solid-liquid soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	n-Butylbenzene Butylbenzene 1-phenylbutane	104-51-8	PID	NA NA	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin; dry nose, throat; headache; low blood pressure, tachycardia, abnormal cardiovascular system stress; central nervous system, hematopoietic depression; metallic taste; liver, kidney injury	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	N-ethyl perfluorooctane sulfonamido acetic acid NEtFOSAA N-ethyl perfluorooctane sulfonamido acetic acid (N-EtFOSAA) N-Ethylperfluorooctanesulfonamide N-Ethyl Perfluorooctanesulfonamidoacetic Acid N-ethyl perfluorooctane-sulfonamidoacetic acid N-Ethyl-N-[(heptadecafluorooctyl)sulphonyl]glycine	2991-50-6	NA	None None	Groundwater Soil	inhalation, skin, or eye contact, ingestion	irritation to eyes with eye damage, skin, causing rash, redness or burning, irritation to nose, throat, and lungs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	n-Hexane Hexane, Hexyl hydride, normal-Hexane	110-54-3	PID	500 ppm 1100 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, nose; nausea, headache; peripheral neuropathy: numb extremities, muscle weak; dermatitis; dizziness; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Nickel	7440-02-0	None	NA 10 mg/m^3	Groundwater Soil	ion, ingestion, skin, and/or eye contact	sensitization dermatitis, allergic asthma, pneumonitis; [potential occupational carcinogen]	Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Non-Flammable Gas Mixture CALGAS (Equipment Calibration Gas : Oxygen Methane Hydrogen Sulfide Carbon Monoxide Nitrogen	 7782-44-7 74-82-8 7783-08-4 830-08-0 7727-37-9	Multi-Gas PID	 NA/NA NA/NA 10/100 ppm 50/1200 ppm NA/NA	NA	inhalation	dizziness, headache, and nausea	Breathing: Respiratory support
1.3.1 – 1.3.22	Non-Flammable Gas Mixture CALGAS (Equipment Calibration Gas : Oxygen Isobutylene Nitrogen	 7782-44-7 115-11-7 7727-37-9	PID	 NA/NA NA/NA NA/NA	NA	inhalation	dizziness, headache, and nausea	Breathing: Respiratory support
1.3.1 – 1.3.22	n-Propylbenzene Isocumene Propylbenzene 1-Phenylpropane 1-Propylbenzene Phenylpropane Propylbenzene-n	103-65-1	PID	NA NA	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin; dry nose, throat; headache; low blood pressure, tachycardia, abnormal cardiovascular system stress; central nervous system, hematopoietic depression; metallic taste; liver, kidney injury	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	o-Xylenes 1,2-Dimethylbenzene ortho-Xylene o-Xylol	95-47-6 179601-23-1	PID	100 ppm 900 ppm	Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; nausea, vomiting, abdominal pain; dermatitis	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	p-Cresol para-Cresol 4-Cresol p-Cresylic acid 1-Hydroxy-4-methylbenzene 4-Hydroxytoluene 4-Methylphenol 4-Methylphenols	106-44-5	PID	5 ppm 250 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, mucous membrane; central nervous system effects: confusion, depression, resp failure; dyspnea (breathing difficulty), irregular rapid respiration, weak pulse; eye, skin, burns; dermatitis; lung, liver, kidney, pancreas damage	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Perfluorobutanoic Acid Heptafluorobutyric acid Heptafluorobutanoic acid Perfluorobutyric acid PFBA	375-22-4	NA	None None	Groundwater	inhalation, skin, or eye contact, ingestion	irritation to eyes with eye damage, skin, causing rash, redness or burning, irritation to nose, throat, and lungs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Perfluorodecanesulfonic Acid PFDS	335-77-3	NA	NA NA	Groundwater	inhalation, skin, or eye contact, ingestion	irritation to eyes with eye damage, skin, causing rash, redness or burning, irritation to nose, throat, and lungs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Perfluorodecanoic acid PFDA	335-76-2	NA	None None	Groundwater	inhalation, skin, or eye contact, ingestion	irritation to eyes with eye damage, skin, causing rash, redness or burning, irritation to nose, throat, and lungs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Perfluoroheptane sulfonic Acid Perfluoroheptane sulfonate Perfluoroheptanesulfonic acid PFHpS	375-92-8	NA	None None	Groundwater Soil	inhalation, skin, or eye contact, ingestion	irritation to eyes with eye damage, skin, causing rash, redness or burning, irritation to nose, throat, and lungs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Perfluoroheptanoic acid Perfluoroheptanoic acid Tridecafluoroheptanoic acid PFHpA	375-85-9	NA	None None	Groundwater	inhalation, skin, or eye contact, ingestion	irritation to eyes with eye damage, skin, causing rash, redness or burning, irritation to nose, throat, and lungs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Perfluorohexanesulfonic Acid perfluorohexanesulfonate perfluorohexanesulfonic acid Perfluorohexane-1-sulphonic acid PFHxS	355-46-4	NA	None None	Groundwater	inhalation, skin, or eye contact, ingestion	irritation to eyes with eye damage, skin, causing rash, redness or burning, irritation to nose, throat, and lungs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Perfluorohexanoic Acid PFHxA	307-24-4	NA	None None	Groundwater	inhalation, skin, or eye contact, ingestion	irritation to eyes with eye damage, skin, causing rash, redness or burning, irritation to nose, throat, and lungs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Perfluorooctanesulfonic Acid PFOS	1763-23-1	NA	None None	Groundwater	inhalation, skin, or eye contact, ingestion	irritation to eyes with eye damage, skin, causing rash, redness or burning, irritation to nose, throat, and lungs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Perfluorooctanoic Acid PFOA pentadecafluorooctanoic acid perfluorooctanoate perfluorocaprylic acid	335-67-1	NA	None None	Groundwater	inhalation, skin, or eye contact, ingestion	irritation to eyes with eye damage, skin, causing rash, redness or burning, irritation to nose, throat, and lungs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	p-Ethyltoluene 4-Ethyltoluene 1-ethyl-4-methyl-benzene 1-methyl-4-ethylbenzene	622-96-8	NA	NA NA	Soil	ingestion, skin, and/or eye contact	irritation to the eyes, skin, mucous membrane; headache; dermatitis; narcosis, coma	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Phenanthrene	85-01-8	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Groundwater Soil	inhalation, skin, or eye contact, ingestion	irritation to eyes and skin, respiratory irritation (dizziness, weakness, fatigue, nausea, headache)	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.22	Phenol Carbolic acid Hydroxybenzene, Monohydroxybenzene Phenyl alcohol Phenyl hydroxide	108-95-2	PID	5 ppm 250 ppm	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, nose, throat; anorexia, weight loss; lassitude (weakness, exhaustion), muscle ache, pain; dark urine, skin, burns; dermatitis; tremor, convulsions, twitching	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Potassium	7440-09-7	None	NA NA	Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact inhalation, ingestion, skin, and/or eye contact	eye: Causes eye burns. Skin: Causes skin, burns. Reacts with moisture in the skin, to form potassium hydroxide and hydrogen with heat. ingestion: Causes gastrointestinal tract burns. inhalation: May cause irritation of the respiratory tract with burning pain in the nose and throat, coughing, wheezing, shortness of breath and pulmonary edema. Causes chemical burns to the respiratory tract. inhalation may be fatal because of spasm, inflammation, edema of the larynx and bronchi, chemical pneumonitis, and pulmonary edema.	Eyes: Get medical aid immediately Skin: Get medical aid immediately. Immediately flush skin with water for at least 15 minutes while removing contaminated clothing and shoes. Ingestion: If victim is conscious and alert, give 2-4 full cups of milk or water. Get medical aid immediately. inhalation: Get medical aid immediately.
1.3.1 – 1.3.22	Propylene Propene Methyl ethylene	115-07-1	PID	NA NA	Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, nose, throat, skin, burns. asphyxiation	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	p-Xylenes 1,4-Dimethylbenzene para-Xylene p-Xylol	106-42-3	PID	100 ppm 900 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; nausea, vomiting, abdominal pain; dermatitis	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Pyrene benzo[def]phenanthrene	129-00-0	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Groundwater Soil	inhalation, skin, or eye contact, ingestion	irritation to eyes and skin, respiratory irritation (dizziness, weakness, fatigue, nausea, headache)	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.22	sec-Butylbenzene 2-phenylbutane	135-98-8	PID	10 ppm 100 ppm	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, nose, throat. inhalation: nausea or vomiting	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Selenium	7782-49-2	None	1 mg/m^3 0.2 mg/m^3	Soil	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat; visual disturbance; headache; chills, fever; dyspnea (breathing difficulty), bronchitis; metallic taste, garlic breath, gastrointestinal disturbance; dermatitis; eye, skin, burns; in animals: anemia; liver necrosis, cirrhosis; kidney, spleen damage	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Silver	7440-22-4	None	0.01mg/ m^3 10 mg/m^3	Soil	inhalation, ingestion, skin, and/or eye contact	blue-gray eyes, nasal septum, throat, skin; irritation, ulceration skin; gastrointestinal disturbance	Eye: Irrigate immediately Skin: Water flush Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Sodium	7440-23-5	None	NA NA	Groundwater Soil	ion, ingestion, skin, and/or eye contact	sensitization dermatitis, allergic asthma, pneumonitis; [potential occupational carcinogen]	Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate; 8:2 FTS Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2) (8:2FTS)	27619-96-1	NA	None None	Groundwater	inhalation, skin, or eye contact, ingestion	irritation to eyes with eye damage, skin, causing rash, redness or burning, irritation to nose, throat, and lungs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Styrene Ethenyl benzene Phenylethylene Styrene monomer Styrol Vinyl benzene	100-42-5	PID	100 ppm 700 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, nose, respiratory system; headache, lassitude (weakness, exhaustion), dizziness, confusion, malaise (vague feeling of discomfort), drowsiness, unsteady gait; narcosis; defatting dermatitis; liver injury; reproductive effects	Eye: Irrigate immediately Skin: Water flush Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Tert-Butyl Alcohol Tertiary Butyl Alcohol Tert-Butanol Butyl alcohol 2-Methyl-2-propanol Trimethyl carbinol Tert-Butyl Alcohol TBA	75-65-0	PID	100 ppm 1600 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat; drowsiness, narcosis	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	tert-Butylbenzene *t*-Butylbenzene 2-Methyl-2-phenylpropane Pseudobutylbenzene	98-06-6	PID	10 ppm NA	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	eye, skin, irritation; dry nose, throat; headaches; low blood pressure, tachycardia; abnormal cardiovascular system; central nervous system depression; hematopoietic depression	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Tetrachloroethane 1,1,2,2-Tetrachloroethane Acetylene tetrachloride Symmetrical tetrachloroethane	79-34-5	PID	5 ppm 100 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	nausea, vomiting, abdominal pain; tremor fingers; jaundice, hepatitis, liver tenderness; dermatitis; leukocytosis (increased blood leukocytes); kidney damage; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Tetrachloroethylene Perchlorethylene Perchloroethylene PCE Perk Tetrachlorethylene Tetrachloroethene	127-18-4	PID	100 ppm 150 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, incoordination; headache, drowsiness; skin, erythema (skin, redness); liver damage; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Thallium	7440-28-0	None	0.1 mg/m^3 15 mg/m^3	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	nausea, diarrhea, abdominal pain, vomiting; ptosis, strabismus; peri neuritis, tremor; retrosternal (occurring behind the sternum) tightness, chest pain, pulmonary edema; convulsions, chorea, psychosis; liver, kidney damage; alopecia; paresthesia legs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Toluene Methyl benzene Methyl benzol Phenyl methane Toluol	108-88-3	PID	200 ppm 500 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, nose; lassitude (weakness, exhaustion), confusion, euphoria, dizziness, headache; dilated pupils, lacrimation (discharge of tears); anxiety, muscle fatigue, paresthesia; dermatitis	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Total PCBs Chlorodiphenyl (42% chlorine) Aroclor® 1242 PCB Polychlorinated biphenyl	53469-21-9	None	0.5 mg/m^3 5 mg/m^3	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, chloracne	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Total Xylenes Dimethylbenzene Xylol	1330-20-7	PID	100 ppm 900 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; nausea, vomiting, abdominal pain; dermatitis	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Trichloroethylene Trichloroetheneylenes Ethylene trichloride TCE Trichloroethene Trilene	79-01-6	PID	100 ppm 1000 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin; headache, visual disturbance, lassitude (weakness, exhaustion), dizziness, tremor, drowsiness, nausea, vomiting; dermatitis; cardiac arrhythmias, paresthesia; liver injury; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Trichlorofluoromethane Fluorotrichloromethane Freon® 11 Monofluorotrichloromethane Refrigerant 11 Trichloromonofluoromethane Freon 11	75-69-4	PID	1000 ppm 2000 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	incoordination, tremor; dermatitis; cardiac arrhythmias, cardiac arrest; asphyxia; liquid: frostbite	Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Trivalent Chromium Chromium III Chromium, Trivalent	NA	None	1.0 mg/m^3 250 mg/m^3	Groundwater Soil	inhalation absorption ingestion	irritation to eye, skin, and respiratory	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Vanadium	7440-62-2	None	0.1 mg/m3 15 mg/m3	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	nausea, diarrhea, abdominal pain, vomiting; ptosis, strabismus; peri neuritis, tremor; retrosternal (occurring behind the sternum) tightness, chest pain, pulmonary edema; convulsions, chorea, psychosis; liver, kidney damage; alopecia; paresthesia legs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Vinyl Chloride Chloroethene Chloroethylen Ethylene monochloride Monochloroethene Monochloroethylene VC Vinyl chloride monomer (VCM)	75-01-4	PID	1 ppm NA	Groundwater Soil Vapor	inhalation, skin, and/or eye contact (liquid)	lassitude (weakness, exhaustion); abdominal pain, gastrointestinal bleeding; enlarged liver; pallor or cyanosis of extremities; liquid: frostbite; [potential occupational carcinogen]	Eye: Frostbite Skin: Frostbite Breathing: Respiratory support
1.3.1 – 1.3.22	Zinc	7440-62-2	None	15 mg/m^3 500 mg/m^3	Groundwater Soil	inhalation	chills, muscle ache, nausea, fever, dry throat, cough; lassitude (weakness, exhaustion); metallic taste; headache; blurred vision; low back pain; vomiting; malaise (vague feeling of discomfort); chest tightness; dyspnea (breathing difficulty), rales, decreased pulmonary function	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately

EXPLANATION OF ABBREVIATIONS

PID = Photoionization Detector

PEL = Permissible Exposure Limit (8-hour Time Weighted Average)

IDLH = Immediately Dangerous to Life and Health

ppm = part per million
mg/m^3 = milligrams per cubic meter
500 mg/m^3

TABLE 3
SUMMARY OF MONITORING EQUIPMENT

Instrument	Operation Parameters
Photoionization Detector (PID)	**Hazard Monitored:** Many organic and some inorganic gases and vapors. **Application:** Detects total concentration of many organic and some inorganic gases and vapors. Some identification of compounds is possible if more than one probe is measured. **Detection Method:** Ionizes molecules using UV radiation; produces a current that is proportional to the number of ions. **General Care/Maintenance:** Recharge or replace battery. Regularly clean lamp window. Regularly clean and maintain the instrument and accessories. **Typical Operating Time:** 10 hours. 5 hours with strip chart recorder.
Oxygen Meter	**Hazard Monitored:** Oxygen (O_2). **Application:** Measures the percentage of O_2 in the air. **Detection Method:** Uses an electrochemical sensor to measure the partial pressure of O_2 in the air, and converts the reading to O_2 concentration. **General Care/Maintenance:** Replace detector cell according to manufacturer's recommendations. Recharge or replace batteries prior to explanation of the specified interval. If the ambient air is less than 0.5% C O_2, replace the detector cell frequently. **Typical Operating Time:** 8 – 12 hours.
Additional equipment (if needed, based on site conditions)	
Combustible Gas Indicator (CGI)	**Hazard Monitored:** Combustible gases and vapors. **Application:** Measures the concentration of combustible gas or vapor. **Detection Method:** A filament, usually made of platinum, is heated by burning the combustible gas or vapor. The increase in heat is measured. Gases and vapors are ionized in a flame. A current is produced in proportion to the number of carbon atoms present. **General Care/Maintenance:** Recharge or replace battery. Calibrate immediately before use. **Typical Operating Time:** Can be used for as long as the battery lasts, or for the recommended interval between calibrations, whichever is less.
Flame Ionization Detector (FID) with Gas Chromatography Option *(i.e., Foxboro Organic Vapor Analyzer (OVA))*	**Hazard Monitored:** Many organic gases and vapors (approved areas only). **Application:** In survey mode, detects the concentration of many organic gases and vapors. In gas chromatography (GC) mode, identifies and measures specific compounds. In survey mode, all the organic compounds are ionized and detected at the same time. In GC mode, volatile species are separated. **General Care/Maintenance:** Recharge or replace battery. Monitor fuel and/or combustion air supply gauges. Perform routine maintenance as described in the manual. Check for leaks. **Typical Operating Time:** 8 hours; 3 hours with strip chart recorder.
Potable Infrared (IR) Spectrophotometer	**Hazard Monitored:** Many gases and vapors. **Application:** Measures concentration of many gases and vapors in air. Designed to quantify one or two component mixtures. **Detection Method:** Passes different frequencies of IR through the sample. The frequencies absorbed are specific for each compound. **General Care/Maintenance:** As specified by the manufacturer.

Instrument	Operation Parameters
Direct Reading Colorimetric Indicator Tube	**Hazard Monitored:** Specific gas and vapors. **Application:** Measures concentration of specific gases and vapors. **Detection Method:** The compound reacts with the indicator chemical in the tube, producing a stain whose length or color change is proportional to the compound's concentration. **General Care/Maintenance:** Do not use a previously opened tube even if the indicator chemical is not stained. Check pump for leaks before and after use. Refrigerate before use to maintain a shelf life of about 2 years. Check expiration dates of tubes. Calibrate pump volume at least quarterly. Avoid rough handling which may cause channeling.
Aerosol Monitor	**Hazard Monitored:** Airborne particulate (dust, mist, fume) concentrations. **Application:** Measures total concentration of semi-volatile organic compounds, PCBs, and metals. **Detection Method:** Based on light-scattering properties of particulate matter. Using an internal pump, air sample is drawn into the sensing volume where near infrared light scattering is used to detect particles. **General Care/Maintenance:** As specified by the mfr. Also, the instrument must be calibrated with particulates of a size and refractive index similar to those to be measured in the ambient air.
Monitox	**Hazard Monitored:** Gases and vapors. **Application:** Measures specific gases and vapors. **Detection Method:** Electrochemical sensor specific for the chemical species in question. **General Care/Maintenance:** Moisten sponge before use; check the function switch; change the battery when needed.
Gamma Radiation Survey Instrument	**Hazard Monitored:** Gamma Radiation. **Application:** Environmental radiation monitor. **Detection Method:** Scintillation detector. **General Care/Maintenance:** Must be calibrated annually at a specialized facility. **Typical Operating Time:** Can be used for as long as the battery lasts, or for the recommended interval between calibrations, whichever is less.

TABLE 4
INSTRUMENTATION ACTION LEVELS

Photoionization Detector Action Levels	**Action Required**
Background to 5 parts per million (ppm)[1]	No respirator needed; no further action
>5ppm but </= 15 ppm at the perimeter of the work area	• Work temporarily halted and monitoring continues. • If instantaneous readings decrease below 5 ppm above background, work activities will resume with continued monitoring
>5ppm but </= 25 ppm at the downwind perimeter of the hot zone	• Work activities will be halted. • Source of vapors identified. • Corrective actions taken to abate emissions. • Continued monitoring. • Workers will don appropriate respirators and work can resume if vapor levels 200 feet downwind or the hot zone or half the distance to the nearest potential receptor or residential or commercial structure, whichever is less – but in no case less than 20 feet – is below 5 ppm above background for the 15-minute average
>25ppm at the parameter of the hot zone	Activities will shut down

Particulate Monitoring Action Levels	**Action Required**
Background to 100 micrograms per cubic meter (µg/m³)[2], no dust observed	No further action
Background to 100 µg/m³, dust observed leaving the work area	Dust suppression must be employed.
100 to 150 µg/m³ at the downwind parameter of the hot zone	• Work activities will be halted. • Source of dust identified. • Dust suppression activities initiated. • Corrective actions taken to abate emissions. • Continued monitoring. • Workers will don appropriate respirators. • Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM10 concentration to within 150 µg/m³ of the upwind level and in preventing visible dust migration.
>150 µg/m³ at the parameter of the hot zone	Activities will shut down

[1] VOC concentrations are 15-minute averages above site background (upwind parameter)
[2] Particulate concentrations are 15-minute averages above site background (upwind parameter)

TABLE 5
EMERGENCY NOTIFICATION LIST

ORGANIZATION	CONTACT	TELEPHONE
Local Police Department		911
Local Fire Department		911
Ambulance/Rescue Squad		911
Hospital	New York Hospital Queens	911 or 718-670-1231
Langan Incident Hotline		800-952-6426 extension 4699
Medical Treatment Hotline	WorkCare™	911 or 888-449-7757
Langan Environmental PM Langan Geotechnical PM Langan Site Civil Project PM	Nicholas Palumbc Vijayakrishnan Veluchamy Matthew Read	917-479-5435 (cell) 716-479-5480 (cell) 212-479-5522 (office)
Langan Health and Safety Manager (HSM)	Tony Moffa	215-756-2523 (cell)
Langan Health & Safety Officer (HSO)	William Bohrer	410-984-3068 (cell)
Langan Field Team Leader (FTL)	To Be Determined	
Client's Representative	Jim Strobel	203-485-9583
National Response Center (NRC)		800-424-8802
Chemical Transportation Emergency Center (Chemtrec)		800-424-9300
Center for Disease Control (CDC)		404-639-3534
EPA (RCRA Superfund Hotline)		800-424-9346
TSCA Hotline		202-554-1404
Poison Control Center		800-222-1222

Immediately following an injury, unless immediate emergency medical treatment is required, the injured employee must contact WorkCare - Incident Intervention® at 888-449-7787.

For all other incidents or near misses, unless emergency response is required, either the employee or a coworker must contact the Langan Incident Hotline at 973-560-4699.

TABLE 6
SUGGESTED FREQUENCY OF PHYSIOLOGICAL MONITORINGFOR FIT AND ACCLIMATED WORKERS[A]

Adjusted Temperature[b]	Normal Work Ensemble[c]	Impermeable Ensemble
90°F or above (32.2°C) or above	After each 45 min. of work	After each 15 min. of work
87.5°F (30.8°-32.2°C)	After each 60 min. of work	After each 30 min. of work
82.5°-87.5°F (28.1°-30.8°C)	After each 90 min. of work	After each 60 min. of work
77.5°-82.5°F (25.3°-28.1°C)	After each 120 min. of work	After each 90 min. of work
72.5°-77.5°F (22.5°-25.3°C)	After each 150 min. of work	After each 120 min. of work

a For work levels of 250 kilocalories/hour.

b Calculate the adjusted air temperature (ta adj) by using this equation: ta adj ^{o}F = ta ^{o}F + (13 x % sunshine). Measure air temperature (ta) with a standard mercury-in-glass thermometer, with the bulb shielded from radiant heat. Estimate percent sunshine by judging what percent time the sun is not covered by clouds that are thick enough to produce a shadow. (100 percent sunshine = no cloud cover and a sharp, distinct shadow; 0 percent sunshine = no shadows.)

c A normal work ensemble consists of cotton coveralls or other cotton clothing with long sleeves and pants.

TABLE 7

HEAT INDEX

ENVIRONMENTAL TEMPERATURE (Fahrenheit)

RELATIVE HUMIDITY	70	75	80	85	90	95	100	105	110	115	120
	APPARENT TEMPERATURE*										
0%	64	69	73	78	83	87	91	95	99	103	107
10%	65	70	75	80	85	90	95	100	105	111	116
20%	66	72	77	82	87	93	99	105	112	120	**130**
30%	67	73	78	84	90	96	104	113	123	**135**	**148**
40%	68	74	79	86	93	101	110	123	**137**	**151**	
50%	69	75	81	88	96	107	120	**135**	**150**		
60%	70	76	82	90	100	114	**132**	**149**			
70%	70	77	85	93	106	124	**144**				
80%	71	78	86	97	113	**136**					
90%	71	79	88	102	122						
100%	72	80	91	108							

*Combined Index of Heat and Humidity...what it "feels like" to the body
Source: National Oceanic and Atmospheric Administration

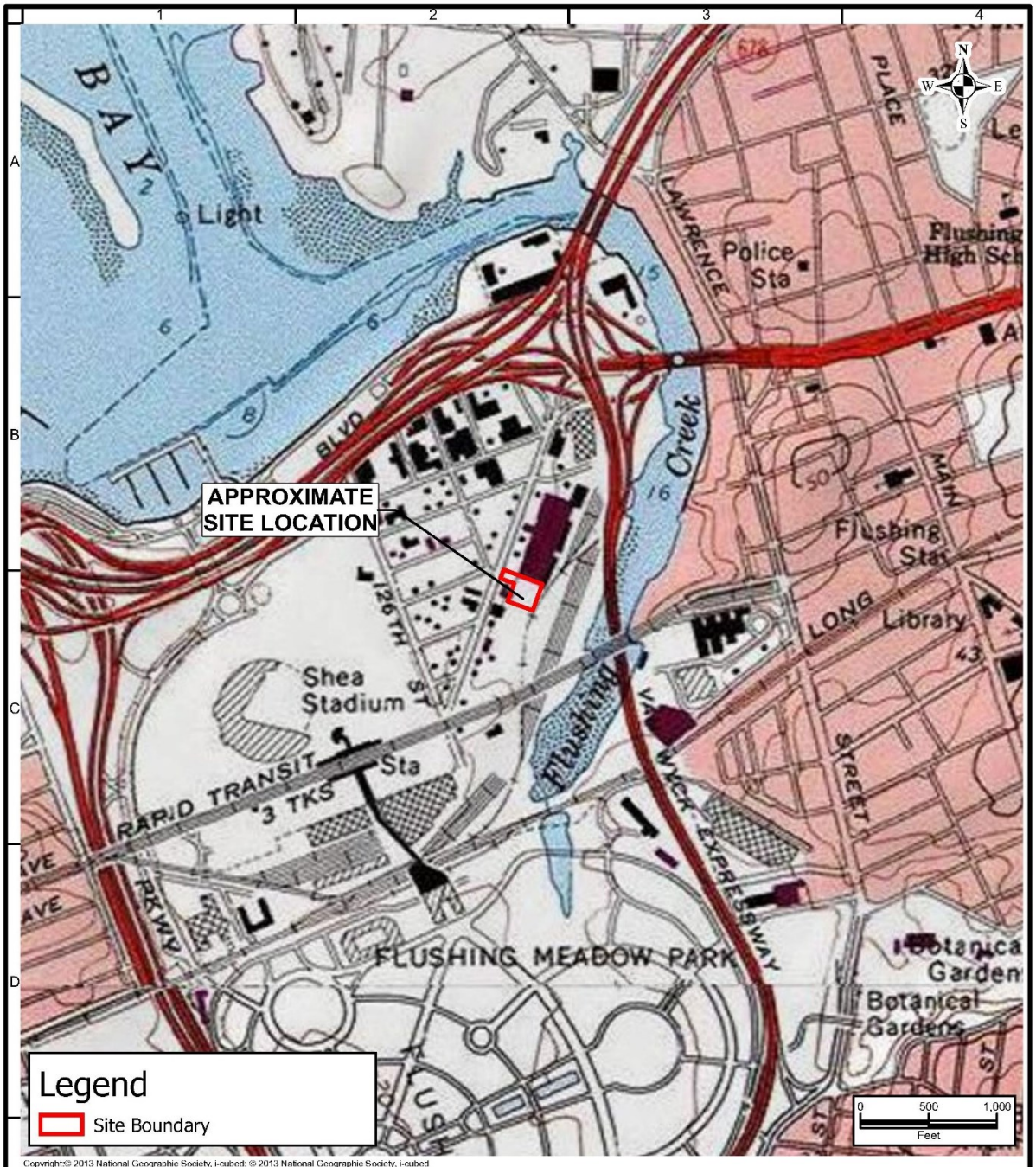
How to use Heat Index:
1. Across top locate Environmental Temperature
2. Down left side locate Relative Humidity
3. Follow across and down to find Apparent Temperature
4. Determine Heat Stress Risk on chart at right

Note: Exposure to full sunshine can increase Heat Index values by up to 15 degrees F.

Apparent Temperature	Heat Stress Risk with Physical Activity and/or Prolonged Exposure
90-105	Heat Cramps or Heat Exhaustion Possible
105-130	Heat Cramps or Heat Exhaustion Likely, Heat Stroke Possible
>130	Heatstroke Highly Likely

FIGURES

FIGURE 1
SITE LOCATION MAP



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Langan Engineering & Environmental Services, Inc.
Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
Langan International
Collectively known as Langan

Project	Willets Point Development L-Parcel CORONA QUEENS COUNTY NEW YORK
Drawing Title	SITE LOCATION
Project No.	170197605
Date	10/23/2023
Scale	1:1,000
Drawn By	Site Analyzer
Submission Date	10/23/2023
Figure	1
	Sheet 1 of 1

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Spatial Reference: NAD 1983 StatePlane New York Long Island FIPS 3104 Feet
Warning: It is a violation of the NYS Education Law Article 145 for any person, unless acting under the direction of a licensed professional engineer, land surveyor or geologist, to alter this item in any way.

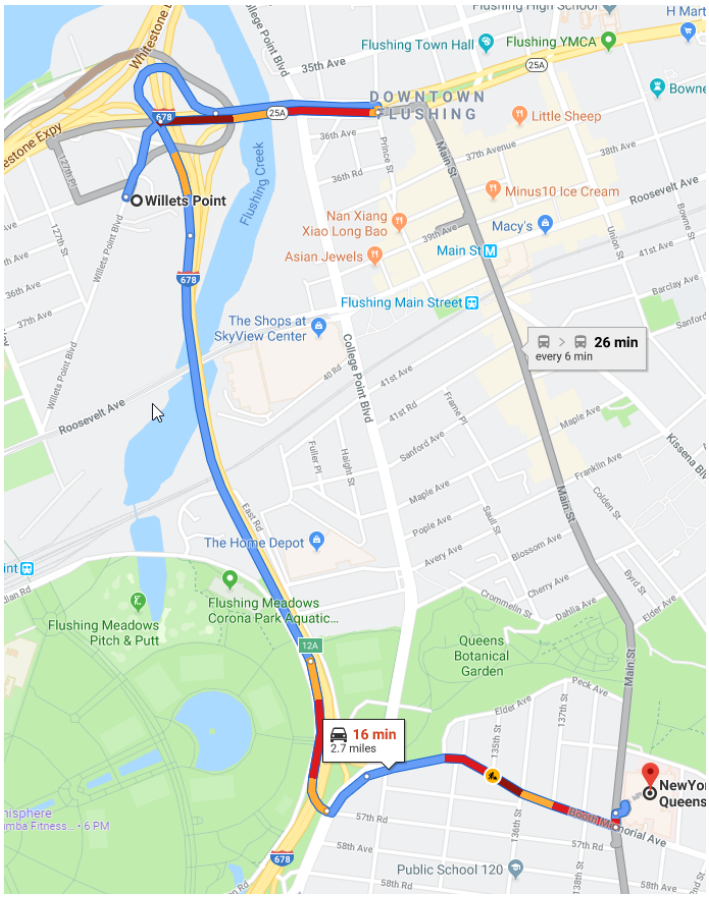
FIGURE 2
HOSPITAL ROUTE PLAN

Hospital Location: **New York Presbyterian Queens Hospital**
56-45 Main Street
Flushing, New York
718-670-1231

START: 126th Street and Willets Point Boulevard, Queens, New York

1. Head north on Willets Point Boulevard toward 34th Avenue
2. Slight right onto NY-25A E/Northern Boulevard
3. Make a U-turn at Prince Street
4. Use the right lane to take the ramp to Kennedy Airport
5. Merge onto I-678 South
6. Take exit 12A for College Point Boulevard toward Interstate 495
7. Turn left onto College Point Boulevard
8. Slight right onto Booth Memorial Avenue
9. Turn left onto Main Street
10. Turn right, destination will be on the right.

END: New York Presbyterian Queens Hospital, 46-45 Main Street, Flushing, NY



ATTACHMENTS

ATTACHMENT A

STANDING ORDERS

STANDING ORDERS

GENERAL

- No smoking, eating, or drinking in this work zone.
- Upon leaving the work zone, personnel will thoroughly wash their hands and face.
- Minimize contact with contaminated materials through proper planning of work areas and decontamination areas, and by following proper procedures. Do not place equipment on the ground. Do not sit on contaminated materials.
- No open flames in the work zone.
- Only properly trained and equipped personnel are permitted to work in potentially contaminated areas.
- Always use the appropriate level of personal protective equipment (PPE).
- Maintain close contact with your buddy in the work zone.
- Contaminated material will be contained in the Exclusion Zone (EZ).
- Report any unusual conditions.
- Work areas will be kept clear and uncluttered. Debris and other slip, trip, and fall hazards will be removed as frequently as possible.
- The number of personnel and equipment in the work zone will be kept to an essential minimum.
- Be alert to the symptoms of fatigue and heat/cold stress, and their effects on the normal caution and judgment of personnel.
- Conflicting situations which may arise concerning safety requirements and working conditions must be addressed and resolved quickly by the site HSO.

TOOLS AND HEAVY EQUIPMENT

- Do not, under any circumstances, enter or ride in or on any backhoe bucket, materials hoist, or any other device not specifically designed to carry passengers.
- Loose-fitting clothing or loose long hair is prohibited around moving machinery.
- Ensure that heavy equipment operators and all other personnel in the work zone are using the same hand signals to communicate.
- Drilling/excavating within 10 feet in any direction of overhead power lines is prohibited.
- The locations of all underground utilities must be identified and marked out prior to initiating any subsurface activities.
- Check to ensure that the equipment operator has lowered all blades and buckets to the ground before shutting off the vehicle.
- If the equipment has an emergency stop device, have the operator show all personnel its location and how to activate it.
- Help the operator ensure adequate clearances when the equipment must negotiate in tight quarters; serve as a signal operator to direct backing, as necessary.
- Ensure that all heavy equipment that is used in the Exclusion Zone is kept in that zone until the job is done and that such equipment is completely decontaminated before moving it into the clean area of the work zone.
- Samplers must not reach into or get near rotating equipment such as the drill rig. If personnel must work near any tools that could rotate, the equipment operator must completely shut down the rig prior to initiating such work. It may be necessary to use a remote sampling device.

ATTACHMENT B

DECONTAMINATION PROCEDURES

PERSONNEL DECONTAMINATION

LEVEL C DECONTAMINATION

Station 1:	Equipment Drop	1. Deposit equipment used on-site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths. Segregation at the drop reduces the probability of cross-contamination. During hot weather operations, cool down stations may be set up within this area.
Station 2:	Outer Garment, Boots, and Gloves Wash and Rinse	2. Scrub outer boots, outer gloves, and chemical-resistant splash suit with decon solution or detergent and water. Rinse off using copious amounts of water.
Station 3:	Outer Boot and Glove Removal	3. Remove outer boots and gloves. Deposit in container with plastic liner.
Station 4:	Canister or Mask Change	4. If worker leaves Exclusion Zone to change canister (or mask), this is the last step in the decontamination procedure. Worker's canister is exchanged, new outer gloves and boot covers donned, joints taped, and worker returns to duty.
Station 5:	Boot, Gloves and Outer Garment Removal	5. Boots, chemical-resistant splash suit, inner gloves removed and deposited in separate containers lined with plastic.
Station 6:	Face piece Removal	6. Face piece is removed (avoid touching face with fingers). Face piece deposited on plastic sheets.
Station 7:	Field Wash	7. Hands and face are thoroughly washed. Shower as soon as possible.

LEVEL D DECONTAMINATION

Station 1:	Equipment Drop	1. Deposit equipment used on-site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths. Segregation at the drop reduces the probability of cross contamination. During hot weather operations, cool down stations may be set up within this area.
Station 2:	Outer Garment, Boots, and Gloves Wash and Rinse	2. Scrub outer boots, outer gloves and chemical-resistant splash suit with decon solution or detergent and water. Rinse off using copious amounts of water.
Station 3:	Outer Boot and Glove Removal	3. Remove outer boots and gloves. Deposit in container with plastic liner.
Station 4:	Boot, Gloves and Outer Garment Removal	4. Boots, chemical-resistant splash suit, inner gloves removed and deposited in separate containers lined with plastic.
Station 5:	Field Wash	5. Hands and face are thoroughly washed. Shower as soon as possible.

EQUIPMENT DECONTAMINATION

GENERAL:

Equipment to be decontaminated during the project may include tools, monitoring equipment, respirators, sampling containers, laboratory equipment, and drilling equipment.

All decontamination will be done by personnel in protective gear, appropriate for the level of decontamination, as determined by the site HSO. The decontamination work tasks will be split or rotated among support and work crews.

Depending on site conditions, backhoes and pumps may be decontaminated over a portable decontamination pad to contain wash water; or wash water may be allowed to run off into a storm sewer system. Equipment needed may include a steam generator with high-pressure water, empty drums, screens, screen support structures, and shovels. Drums will be used to hold contaminated wash water pumped from the lined pit. These drums will be labeled as such.

Miscellaneous tools and equipment will be dropped into a plastic bucket, tub, or other containers. They will be brushed off and rinsed with a detergent solution, and finally rinsed with clean water.

MONITORING EQUIPMENT:

Monitoring equipment will be protected as much as possible from contamination by draping, masking, or otherwise covering as many of the instruments as possible with plastic without hindering the operation of the unit. The PID, HNu, or OVA meter, for example, can be placed in a clear plastic bag, which allows reading of the scale and operation of knobs. The probes can be partially wrapped keeping the sensor tip and discharge port clear.

The contaminated equipment will be taken from the drop area and the protective coverings removed and disposed of in the appropriate containers. Any dirt or obvious contamination will be brushed or wiped with a disposable paper wipe.

RESPIRATORS:

Respirators will be cleaned and disinfected after every use. Taken from the drop area, the masks (with the cartridges removed and disposed of with other used disposable gear) will be immersed in a cleaning solution and scrubbed gently with a soft brush, followed by a rinse in plain warm water, and then allowed to air dry. In the morning, new cartridges will be installed. Personnel will inspect their own masks for serviceability prior to donning them. And, once the mask is on, the wearer will check the respirator for leakage using the negative and positive pressure fit check techniques.

ATTACHMENT C

EMPLOYEE EXPOSURE/INJURY INCIDENT REPORT

EMPLOYEE INCIDENT/INJURY REPORT
LANGAN ENGINEERING & ENVIRONMENTAL SERVICES

(Complete and return to Tony Moffa in the Doylestown Office)

Affected Employee Name: _____ Date: _____

Incident type: ☐ Injury ☐ Report Only/No Injury
☐ Near Miss ☐ Other: _____

EMPLOYEE INFORMATION (Person completing Form)

Employee Name: _____ Employee No: _____

Title: _____ Office Location: _____

Length of time employed or date of hire: _____

Mailing address: _____

_____

Sex: M ☐ F ☐ Birth date: _____

Business phone & extension: _____ Residence/cell phone: _____

ACCIDENT INFORMATION

Project: _____ Project #: _____

Date & time of incident: _____ Time work started & ended: _____

Site location: _____

Incident Type: Possible Exposure ☐ Exposure ☐ Physical Injury ☐

Names of person(s) who witnessed the incident:_____

_____

_____

Exact location incident occurred:

_____

_____

Describe work being done:_____

_____

_____

_____

Describe what affected employee was doing prior to the incident occurring:

_____

_____

_____

Describe in detail how the incident occurred:

_____

_____

_____

_____

Nature of the incident (List the parts of the body affected):

_____

_____

_____

_____

Person(s) to whom the incident was reported (Time and Date):

_____

_____

List the names of other persons affected during this incident:

_____

_____

Possible causes of the incident (equipment, unsafe work practices, lack of PPE, etc.):

Weather conditions during incident:

MEDICAL CARE INFORMATION

Did affected employee receive medical care? Yes ☐ No ☐

If Yes, when, and where was medical care received:

Provide name of facility (hospital, clinic, etc.):

Length of stay at the facility?

Did the employee miss any work time? Yes ☐ No ☐ Undetermined ☐

Date employee last worked: Date employee returned to work:

Has the employee returned to work? Yes ☐ No ☐

Does the employee have any work limitations or restrictions from the injury? : Yes ☐ No ☐

If Yes, please describe:

Did the exposure/injury result in permanent disability? Yes ☐ No ☐ Unknown ☐

If Yes, please describe:

HEALTH & SAFETY INFORMATION

Was the operation being conducted under an established site-specific CONSTRUCTION HEALTH AND SAFETY PLAN?
Yes ☐ No ☐ Not Applicable: ☐

Describe protective equipment and clothing used by the employee:

_____

_____

_____

Did any limitations in safety equipment or protective clothing contribute to or affect exposure/injury? If so, explain:

_____

_____

_____

_____

Employee Signature Date

_____

Langan Representative Date

ATTACHMENT D

CALIBRATION LOG

DATE:_____ **PROJECT:**_____

CALIBRATION LOG

Date & Time	Inst Type	Inst #	Media	Initial Reading	Span #	Calibrate. Reading	Performed By:

ATTACHMENT E

MATERIAL SAFETY DATA SHEETS
SAFETY DATA SHEETS

All Langan Field Personnel Completing This Work Plan Are To Have Real-Time Accessibility To Material Safety Data Sheets (MSDS) or Safety Data Sheets (SDSs) Through Their Smart Phone.

The link is http://www.msds.com/
The login name is "drapehead"
The password is "2angan987"

If You Are Unable To Use the Smart Phone App, You Are To Bring Printed Copies of the MSDS/SDSs to the Site

ATTACHMENT F

JOBSITE SAFETY INSPECTION CHECKLIST

Jobsite Safety Inspection Checklist

Date: _____ **Inspected By:** _____

Location: _____ **Project #:** _____

Check one of the following: **A:** Acceptable **NA**: Not Applicable **D**: Deficiency

	A	NA	D	Remark
1. CHASP available onsite for inspection?				
2. Health & Safety Compliance agreement (in CHASP) appropriately signed by Langan employees and contractors?				
3. Hospital route map with directions posted on site?				
4. Emergency Notification List posted on site?				
5. First Aid kit available and properly stocked?				
6. Personnel trained in CPR/First Aid on site?				
7. MSDSs readily available, and all workers knowledgeable about the specific chemicals and compounds to which they may be exposed?				
8 Appropriate PPE being worn by Langan employees and contractors?				
9. Project site safe practices ("Standing Orders") posted?				
10. Project staff have 40-hr./8-hr./Supervisor HAZWOPER training?				
11. Project staff medically cleared to work in hazardous waste sites and fit-tested to wear respirators, if needed?				
12. Respiratory protection readily available?				
13. Health & Safety Incident Report forms available?				
14. Air monitoring instruments calibrated daily and results recorded on the Daily Instrument Calibration check sheet?				
15. Air monitoring readings recorded on the air monitoring data sheet/field log book?				
16. Subcontract workers have received 40-hr./8-hr./Spvsr. HAZWOPER training, as appropriate?				
17. Subcontract workers medically cleared to work on site, and fit-tested for respirator wear?				
18. Subcontract workers have respirators readily available?				
19. Mark outs of underground utilities done prior to initiating any subsurface activities?				
20. Decontamination procedures being followed as outlined in CHASP?				
21. Are tools in good condition and properly used?				
22. Drilling performed in areas free from underground objects including utilities?				

23. Adequate size/type fire extinguisher supplied?				
24. Equipment at least 20 feet from overhead powerlines?				
25. Evidence that drilling operator is responsible for the safety of his rig.				
26. Trench sides shored, layer back, or boxed?				
27. Underground utilities located and authorities contacted before digging?				
28. Ladders in trench (25-foot spacing)?				
29. Excavated material placed more than 2 feet away from excavation edge?				
30. Public protected from exposure to open excavation?				
31. People entering the excavation regarding it as a permit-required confined space and following appropriate procedures?				
32. Confined space entry permit is completed and posted?				
33. All persons knowledgeable about the conditions and characteristics of the confined space?				
34. All persons engaged in confined space operations have been trained in safe entry and rescue (non-entry)?				
35. Full body harnesses, lifelines, and hoisting apparatus available for rescue needs?				
36. Attendant and/or supervisor certified in basic first aid and CPR?				
37. Confined space atmosphere checked before entry and continuously while the work is going on?				
38. Results of confined space atmosphere testing recorded?				
39. Evidence of coordination with off-site rescue services to perform entry rescue, if needed?				
40. Are extension cords rated for this work being used and are they properly maintained?				
41. Are GFCIs provided and being used?				

Unsafe Acts: _____

_____

_____

_____

Notes: _____

_____

_____

_____

ATTACHMENT G

JOB SAFETY ANALYSIS FORM

LANGAN	**Job Safety Analysis (JSA)** **Health and Safety**
JSA TITLE: **JSA NUMBER:**	**DATE CREATED:** **CREATED BY**: **REVISION DATE:** **REVISED BY:**

Langan employees must review and revise the Job Safety Analysis (JSA) as needed to address the any site specific hazards not identified. Employees must provide their signatures on the last page of the JSA indicating they have review the JSA and are aware the potential hazards associated with this work and will follow the provided preventive or corrective measures.

PERSONAL PROTECTIVE EQUIPMENT REQUIRED: (PPE): ■ Required ☒ As Needed		
☐ Steel-toed boots	☐ Nitrile gloves	☐ Dermal Protection (Specify)
☐ Long-sleeved shirt	☐ Leather/ Cut-resistant gloves	☐ High visibility vest/clothing
☐ Safety glasses	☐ Face Shield	☐ Hard hat
ADDITIONAL PERSONAL PROTECTIVE EQUIPMENT NEEDED (Provide specific type(s) or descriptions)		
☐ Air Monitoring:	☐ Respirators:	☐ Other:
☐ Dermal Protection:	☐ Cartridges:	☐ Other:

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE OR CORRECTIVE ACTION
1.	1. 2.	1a. 1b. 2a. 2b.
2.	1.	1
Additional items identified in the field.		
Additional Items.		

If additional items are identified during daily work activities, please notify all relevant personnel about the change and document on this JSA.

LANGAN	Job Safety Analysis (JSA) Health and Safety
JSA Title: COVID-19 Awareness – Site Work **JSA Number: JSA046-00**	
A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.	

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Boots	☐ Long Sleeves	☐ Safety Vest (Class 2)	☐ Hard Hat	☐ Hearing Protection
☐ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☐ Nitrile Gloves	☐ PVC Gloves
☐ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☒ Other: Alcohol-based hand sanitizer, disinfectant wipes/spray				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
1. All Activities	1. Transmittal/exposure of COVID-19	1. Ask yourself and your managers – is this work essential? Can this be done remotely? 2. Stay home if sick or showing symptoms of COVID-19 (e.g. fever, cough, etc.). 3. Carry nitrile gloves, alcohol-based hand sanitizer, face coverings and disinfectant wipes/spray during field work. 4. Check federal, state, and/or local travel restrictions **prior** to travel. Many states, counties, and cities are passing strict "shelter-in-place" or business restrictions in response to COVID-19. 5. Immediately notify Beverly Williams or Rory Johnston (Supervisor if employee chooses) if you display symptoms of COVID-19. Symptoms include fever (over 100.4 F), cough, and shortness of breath. 6. Notify Beverly Williams or Rory Johnston, Supervisor and Coronavirus Task Force if you had close contact with an individual who tested positive or displayed symptoms of COVID-19. 7. Do not touch your face, to the extent possible. 8. Wear face coverings when around other worker to minimize spread of COVID-19. (May be required in certain states or locations.)

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
		9. Practice social distancing, maintaining at least 6 feet of distance between yourself and others. Avoid gatherings of more than 10 people. Limit, to the extent possible, contact with public items/objects. 10. Clean your hands frequently with soap and water for at least 20 seconds especially after you have been in a public place, or after blowing your nose, coughing, sneezing, or using the rest room. 11. If soap and water are not readily available, use a hand sanitizer that contains at least 60% alcohol. Cover all surfaces of your hands and rub them together until they feel dry. 12. Cover your mouth and nose with a tissue when you cough or sneeze or use the inside of your elbow. 13. Clean and disinfect frequently touched surfaces daily, for example, cell phones, computer equipment, headsets, tables, doorknobs, light switches, countertops, handles, desks, toilets, faucets, and sinks.
2. Travel to Jobsite	1. Transmittal/exposure of COVID-19 between passengers 2. Transmittal/exposure of COVID-19 from previous occupants (rental and fleet vehicles) 3. Transmittal/exposure of COVID-19 while refueling	1. Limit the number of occupants to each vehicle to 2 people. Employees should sit as far away from each other as possible. 2. Disinfect high “hand-traffic” areas of the vehicle: Door handles, steering wheel, turn signal and control rods, dashboard controls, seatbelts, armrests, etc. To the extent possible, do not use recycled air for heat/AC and travel with the windows open. 3. Use hand sanitizer before and after pumping gas and only return to the inside of the vehicle after refueling is complete. 4. Wear nitrile gloves if available or disinfect the key pad, pump handle, and fuel grade button prior to use. 5. Recommend face coverings are worn to minimize spread of COVID-19.
3. Conduct Tailgate Safety Meeting & Complete H&S Paperwork	1. Transmittal/exposure of COVID-19 between meeting participants	1. Practice social distancing, maintaining at least 6 feet of distance between yourself and others. 2. Recommend face coverings are worn when around other workers to minimize spread of COVID-19, 3. Hold meetings outside and keep in mind wind direction. To the extent possible, remain cross-wind from other people. 4. Designate a single person to maintain sign-in sheets/permits throughout the day to limit the passing of pens/clipboards between people. 5. Each person should complete their own JSA, even if they are completing similar tasks as others in order to limit the passing of paper/pens/clipboards between people. 6. Include COVID-19 topics and prevention measures in safety meetings.
4. Conduct Site Work	1. Transmittal/exposure of COVID-19 between site workers and public.	1. Practice social distancing maintaining 6 feet of distance between yourself and others. 2. Recommend face coverings are worn when around other workers to minimize spread of COVID-19, 3. To the extent possible, do not interact with the public. If it is necessary, politely explain you are practicing social distance and request they stay at least 6 feet away and they do not attempt to pass objects to you. 4. Wear nitrile gloves during site work underneath the appropriate gloves for your task. Utilize appropriate decontamination procedures, securely bag all waste (including nitrile gloves) generated during site work and dispose of.

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
		5. Do not share tools. Each person should be equipped with the tools to complete their task or tasks should be divided to remove the need to share tools. If tools must be shared, surfaces should be disinfected. 6. Clean and disinfect surfaces of rental tools and equipment upon receipt. To the extent possible rent equipment from Langan's internal equipment reservation center, where cleaning/disinfecting procedures can be verified.
5. Use of Construction Trailers	1. Transmittal/exposure of COVID-19 between site workers and others.	1. Avoid use of shared trailers, if possible. Minimize trailer use to essential personnel. 2. Practice social distancing; maintaining 6 feet of distance between yourself and others in trailer. 3. Clean and disinfect areas including desks, phones, chairs, and other common areas, before and after use.
6. Purchasing Food from a Restaurant	1. Transmittal/exposure of COVID-19 from other customers, staff, surfaces.	1. To the extent possible, bring your own food. 2. If you must visit a restaurant, call ahead for take-out or "contactless delivery." Do not dine in. When picking up food, follow guidelines for Job Step #8: Purchasing Supplies at Retail/Shipping Centers. 3. Wash hands before and after eating.
7. Smoking Cigarettes	1. Transmittal/exposure of COVID-19 by touching mouth with hands	1. Cigarette smokers are at greater risk of complications arising from COVID-19. Nicotine patches/lozenges/gum, smoking cessation programs, and prescription medications may aid in "kicking the habit" if you decide to quit. 2. Wash hands thoroughly before and after smoking. 3. Discard cigarette butts properly. Do not light cigarettes from others and do not give cigarettes to others.
8. Hotel Stay	1. Transmittal/exposure of COVID-19 from previous occupants, hotel staff, common areas.	1. Verify the hotel chain/brand has modified cleaning procedures to reflect risk of COVID-19. Most hotel companies have issued statements on their websites and in email blasts reflecting these new procedures. 2. Use the front door, and not peripheral entrances. Front doors of hotels are usually automatic. 3. Request ground floor room to avoid elevator use and a room that has not be utilized in 48-72 hours. 4. If elevator use is required, do not directly touch elevator buttons with your hands. Do not ride elevators with other people, to the extent possible. 5. Bring disinfecting wipes or sanitizing spray. Upon arrival, disinfect high "hand-traffic" areas of the hotel room: Door handles, light switches, shower/sink faucet handles, TV remote, curtain/blind handles. Clean these surfaces daily. 6. Place the "Do Not Disturb" Sign on your door to prevent people (housekeeping) from entering your room. 7. Avoid common spaces and hotel sponsored events where crowds will be present. 8. Confirm hotel cleaning procedures have been modified to address COVID-19. Confirm no COVID-19 cases have occurred in hotel
9. Purchasing Supplies at Retail/Shipping Centers	1. Transmittal/exposure of COVID-19 from other customers, staff, surfaces.	1. Plan your travel to limit the need to visit retail/shipping centers. 2. Practice social distancing, maintaining at least 6 feet of distance between yourself and others. If the store is too crowded/small, consider visiting another store or returning at a different time. 3. Avoid high "hand-traffic" items/areas like door handles (i.e. use your shoulder, hip/butt, or open with a disposable napkin/paper towel), credit cards terminals (i.e. use Apple/Android pay if available), shopping carts/baskets (i.e. bring your own shopping

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
		bags), counter tops (i.e. ask clerk if you can hold the items while they are scanned) and bulk/buffet items (i.e. just avoid them). 4. Disinfect your hands before and after visiting a retail/shipping center.

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: Environmental Sampling
JSA Number: JSA021-01

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.

S – ***Stop,*** *what has changed?*
T – ***Think*** *about the task*
E – ***Evaluate*** *potential hazards*
P – ***Plan*** *safe approach*
S - ***Start*** *task /* ***Stop*** *& regroup*

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☐ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☐ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☒ Fire Resistant Clothing	☐ Rubber Boots
☒ Insect/Animal Repellent	☒ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☒ Other: Tyvek Sleeves				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
1. Drive to sample location	1. Rough/Off Road terrain	1. Pay attention to road conditions such as road erosion, unprotected embankments, and soft road conditions.
2. Sample Collection (Walking)	1. Slip/Trips/Falls 2. Back strains 3. Wildlife (Insects, Stray animals, rodents) 4. Poisonous vegetation	1. Minimize distance to sample area/ Plan route and check surface prior to carrying heavy equipment/ Locate safest access point/ Follow good housekeeping procedures/ Mark significant below grade hazards (holes, trenches) with spray paint or cones/ Wear foot protection with ankle support and gripping soles. 2. Use proper lifting techniques/ Use wheeled transport/ Obtain assistance where and when needed/ Consider load weight when evaluating what is safe and unsafe to carry. 3. Be aware of surroundings for the presence of wildlife. Do not approach stray animals. Carry and use animal repellant when needed/ Use bug spray when needed. 4. Keep skin covered/ Identify and avoid poisonous vegetation/ Clean areas after contact with suspected vegetation.
3. Sample Collection (Water)	1. Drowning Hazards 2. Chemical burns (when adding acid preservative to sample) 3. Back Strains 4. Ergonomic issues 5. Slip/Trips/Falls	1. Use buddy system/ Wear flotation vest if water is deeper than 2 feet or swift moving/ Select working area with stable footing. Do not attempt to cross or stand in swift moving water. 2. Wear proper PPE (Nitrile gloves, Tyvek Sleeves) 3. Use proper lifting techniques/ Use wheeled transport/ Obtain assistance where and when needed/ Consider load weight when evaluating what is safe or unsafe to carry. 4. When possible avoid bending over for long periods of time/ Use a small stool for sitting or knee pad for kneeling.

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
		5. Minimize distance to sample area/ Plan route and check surface prior to carrying heavy equipment/ Locate safest access point/ Follow good housekeeping procedures/ Mark significant below grade hazards (holes, trenches) with spray paint or cones/ Wear foot protection with ankle support and gripping soles/ Avoid standing water or slippery terrain.
4. All activities	1. Slips/ Trips/ Falls 2. Hand injuries, cuts, or lacerations during manual handling of materials 3. Foot injuries 4. Back injuries 5. Traffic 6. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 7. High Noise levels 8. Overhead hazards 9. Heat Stress/ Cold Stress 10. Eye Injuries	1. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 2. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery, or dirty objects before handling / Wear leather/ cut-resistant gloves 3. Wear Langan approved safety shoes 4. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 5. Wear high visibility clothing & vest / Use cones or signs to designate work area 6. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 7. Wear hearing protection 8. Wear hard hat / Avoid areas were overhead hazards exist. 9. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 10. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: **Subsurface Investigation**
JSA Number: **JSA030-01**

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.

S – *Stop,* what has changed?
T – *Think* about the task
E – *Evaluate* potential hazards
P – *Plan* safe approach
S - *Start* task / *Stop* & regroup

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☒ Safety Goggles	☐ Face Shield	☐ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☒ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☒ Other: Dielectric Overshoes, Sun Block				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
5. Transport equipment to work area	2. Back/strain 3. Slip/Trip/Falls 4. Traffic 5. Cuts/abrasions/contusions from equipment 6. Accidents due to vehicle operations	1. Use proper lifting techniques/Use wheeled transport 2. Minimize distance to work area/unobstructed path to work area/follow good housekeeping procedures 3. Wear proper PPE (high visibility vest or clothing) 4. Wear proper PPE (leather gloves, long sleeves, Langan approved safety shoes) 5. Observe posted speed limits/ Wear seat belts at all times
6. Traffic	1. Hit by moving vehicle	1. Use traffic cones and signage/ Use High visibility traffic vests and clothing/ Caution tape when working near active roadways.
7. Field Work (drilling, resistivity testing, and inspection)	1. Biological Hazards: insects, rats, snakes, poisonous plants, and other animals 2. Heat stress/injuries 3. Cold Stress/injuries 4. High Energy Transmission Lines 5. Underground Utilities 6. Electrical (soil resistivity testing)	1. Inspect work area to identify biological hazards. Wear light colored long sleeve shirt and long pants/ Use insect repellant as necessary/ Beware of tall grass, bushes, woods, and other areas where ticks may live/ Avoid leaving garbage on site to prevent attracting animals/ Identify and avoid contact with poisonous plants/Beware of rats, snakes, or stray animals. 2. Wear proper clothing (light colored)/ drink plenty of water/ take regular breaks/use sun block 3. Wear proper clothing/ dress in layers/ take regular breaks. 4. Avoid direct contact with high energy transmission lines/ position equipment at least 15 feet or as required by PSE&G from the transmission lines/ wear proper PPE (dielectric overshoes 15 kV minimum rating).

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
		5. Call one-call service before performing intrusive field work/ Review utility mark-outs and available utility drawings (with respect to proposed work locations)/ Follow Underground Utility Guidelines 6. See AGI Sting R1 operating manual for specific concerns during operating instrument
8. All activities	1. Slips/ Trips/ Falls 2. Hand injuries, cuts, or lacerations during manual handling of materials 3. Foot injuries 4. Back injuries 5. Traffic 6. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 7. High Noise levels 8. Overhead hazards 9. Heat Stress/ Cold Stress 10. Eye Injuries	7. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 8. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 9. Wear Langan approved safety shoes 10. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 11. Wear high visibility clothing & vest / Use cones or signs to designate work area 12. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 13. Wear proper hearing protection 14. Wear hard hat / Avoid areas were overhead hazards exist. 15. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 16. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN	Job Safety Analysis (JSA) Health and Safety
JSA Title: Field Sampling **JSA Number:** JSA022-01 **A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.**	 S – *Stop,* what has changed? T – *Think* about the task E – *Evaluate* potential hazards P – *Plan* safe approach S - *Start* task / *Stop* & regroup

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☐ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☒ Traffic Cones/Signs	☐ Life Vest/Jacket	
☐ Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
9. Unpack/Transport equipment to work area.	7. Back Strains 8. Slip/Trips/Falls 9. Cuts/Abrasions from equipment 10. Contusions from dropped equipment	6. Use proper lifting techniques/Use wheeled transport 7. Minimize distance to work area/Unobstructed path to work area/follow good housekeeping procedures. Mark slip/trip/fall hazards with orange safety cones. 8. Wear proper PPE (leather gloves, long sleeves). 9. Wear proper PPE (Langan approved safety shoes).
10. Initial Site Arrival-Site Assessment	5. Traffic	5. Situational awareness (be alert of your surroundings). Secure area from through traffic.
11. Surface Water Sampling	6. Contaminated media. Skin/eye contact with biological agents and/or chemicals.	6. Wear appropriate PPE (Safety glasses, appropriate gloves). Review (M)SDS for all chemicals being.
12. Sampling from bridges	1. Struck by vehicles	1. Wear appropriate PPE (Safety Vest). Use buddy system and orange safety cones.
13. Icing of Samples/ Transporting coolers/equipment from work area.	11. Back Strains 12. Slips/Trips/Falls 13. Cuts/Abrasions from equipment 14. Pinch/Crushing Hazards.	17. Drain coolers of water. Use proper lifting techniques. Use wheeled transport. 18. Have unobstructed path from work area. Aware of surroundings. 19. Wear proper PPE (Leather gloves, long sleeves) 20. Wear proper PPE (Leather gloves, long sleeves)
14. Site Departure	1. Contaminated PPE/Vehicle	1. Contaminated PPE should be disposed of on-site. Remove boots and soiled clothing for secure storage in trunk. Wash hands promptly.

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
15. All activities	1. Slips/ Trips/ Falls 2. Hand injuries, cuts, or lacerations during manual handling of materials 3. Foot injuries 4. Back injuries 15. Traffic 16. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 17. High Noise levels 18. Overhead hazards 19. Heat Stress/ Cold Stress 20. Eye Injuries	1. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 2. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery, or dirty objects before handling / Wear leather/ cut-resistant gloves 3. Wear Langan approved safety shoes 4. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 21. Wear high visibility clothing & vest / Use cones or signs to designate work area 22. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 23. Wear hearing protection 24. Wear hard hat / Avoid areas were overhead hazards exist. 25. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 26. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: Equipment Transportation and Set-up
JSA Number: JSA012-01

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.

S – ***Stop,*** *what has changed?*
T – ***Think*** *about the task*
E – ***Evaluate*** *potential hazards*
P – ***Plan*** *safe approach*
S - ***Start*** *task /* ***Stop*** *& regroup*

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☐ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☐ Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
16. Transport equipment to work area	11. Back Strain 12. Slips/ Trips/ Falls 13. Traffic 14. Cuts/abrasions from equipment 15. Contusions from dropped equipment	1. Use proper lifting techniques / Use wheeled transport 2. Minimize distance to work area / Have unobstructed path to work area / Follow good housekeeping procedures 3. Wear proper PPE (high visibility vest or clothing) 4. Wear proper PPE (leather gloves, long sleeves) 5. Wear proper PPE (safety shoes)
17. Moving equipment to its planned location	6. Pinch Hazard 7. Slips/ Trips/ Falls	1. Wear proper PPE (leather gloves) 2. Be aware of potential trip hazards / Practice good housekeeping procedures / Mark significant below-grade hazards (i.e. holes, trenches) with safety cones or spray paint
18. Equipment Set-up	7. Pinch Hazard 8. Cuts/abrasions to knuckles/hands 9. Back Strain	1. Wear proper PPE (leather gloves) 2. Wear proper PPE (leather gloves) 3. Use proper lifting techniques / Use wheeled transport
19. All activities	21. Slips/ Trips/ Falls 22. Hand injuries, cuts, or lacerations during manual handling of materials 23. Foot injuries 24. Back injuries 25. Traffic 26. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.)	27. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 28. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 29. Wear Langan approved safety shoes

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
4. All activities (cont'd)	27. High Noise levels 28. Overhead hazards 29. Heat Stress/ Cold Stress 30. Eye Injuries	30. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 31. Wear high visibility clothing & vest / Use cones or signs to designate work area 32. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 33. Wear hearing protection 34. Wear hard hat / Avoid areas were overhead hazards exist. 35. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 36. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: 55-gallon Drum Sampling
JSA Number: JSA043-01

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.

S – ***Stop,*** *what has changed?*
T – ***Think*** *about the task*
E – ***Evaluate*** *potential hazards*
P – ***Plan*** *safe approach*
S - ***Start*** *task /* ***Stop*** *& regroup*

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☐ Hearing Protection
☒ Safety Glasses	☒ Safety Goggles	☒ Face Shield	☒ Nitrile Gloves	☒ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☒ Other: All Drums are required to be labeled. Langan employees do not open or move undocumented drums or unlabeled drums without proper project manager authorization.				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
20. Unpack/Transport equipment to work area.	16. Back Strains 17. Slip/Trips/Falls 18. Cuts/Abrasions from equipment 4. Contusions from dropped equipment	10. Use proper lifting techniques/Use wheeled transport 11. Minimize distance to work area/Unobstructed path to work area/follow good housekeeping procedures. Mark slip/trip/fall hazards with orange safety cones. 12. Wear proper PPE (leather gloves, long sleeves). 4. Wear proper PPE (Langan approved safety shoes).
21. Open Drums	1. Hand Injuries, cuts or lacerations when untightening drum locking bolt, removing drum lid strap, or removing lid. 2. Pressure from drums.	1. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery, or dirty objects before handling / Wear leather/ cut-resistant gloves. Use non-metallic mallet and non-sparking tools/wrenches. 2. Open drum slowly to relieve pressure. Wear proper PPE: face shield and goggles; correct gloves; and over garments.
22. Collecting Soil/Fluid Sample	8. Irritation to eye from vapor, soil dust, or splashing 9. Irritation to exposed skin	6. Wear proper eye protection including safety glasses/ face shield/googles and when necessary, splash guard. If dust or vapor phase is present, wear appropriate safety breathing gear (1/2 mask or full face mask with correct filter) 7. Wear proper skin protection including nitrile gloves.
23. Closing Drums	1. Hand Injuries, cuts or lacerations when untightening drum locking bolt, removing drum lid strap, or removing lid.	7. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery, or dirty objects before handling / Wear leather/ cut-resistant gloves. Use non-metallic mallet and non-sparking tools/wrenches.

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
24. Moving Drums	2. Hand Injuries, cuts or lacerations when untightening drum locking bolt, removing drum lid strap, or removing lid. 3. Back Strains	2. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery, or dirty objects before handling / Wear leather/ cut-resistant gloves. Use non-metallic mallet and non-sparking tools/wrenches. 3. Use proper lifting techniques/Use wheeled transport
25. All activities	31. Slips/ Trips/ Falls 32. Hand injuries, cuts, or lacerations during manual handling of materials 33. Foot injuries 34. Back injuries 35. Traffic 36. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 37. High Noise levels 38. Overhead hazards 39. Heat Stress/ Cold Stress 40. Eye Injuries	37. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 38. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 39. Wear Langan approved safety shoes 40. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 41. Wear high visibility clothing & vest / Use cones or signs to designate work area 42. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 43. Wear hearing protection 44. Wear hard hat / Avoid areas were overhead hazards exist. 45. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 46. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: Excavation Oversight
JSA Number: JSA041-01

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.

S – *Stop,* what has changed?
T – *Think* about the task
E – *Evaluate* potential hazards
P – *Plan* safe approach
S - *Start* task / *Stop* & regroup

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☒ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☐ Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
26. Transport equipment to work area	19. Back Strain 20. Slips/Trips/Falls 21. Traffic 22. Cuts/abrasions/contusions from equipment	13. Use proper lifting techniques / Use wheeled transport 14. Minimize distance to work area / Have unobstructed path to work area / Follow good housekeeping procedures 15. Wear proper PPE (high visibility vest or clothing) 16. Wear proper PPE (leather gloves, long sleeves, safety shoes)
27. Earth Moving Equipment	10. Equipment running over employee	8. Ensure you have direct line of sight with operator of equipment; do not walk behind equipment; maintain a safe distance away from equipment. 9. Wear proper PPE (high vis vest/clothing)
28. Excavation	10. Excavation collapse 11. Confined space 12. Soil	8. Use proper shoring/benching/sloping techniques; Ladder is properly situated in excavation; no water in excavation; competent person has inspected excavation prior to allow employees to enter. 9. Langan employees are not authorized to enter a confined space; 10. Soil and equipment is kept at least 2 feet from edge of excavation
29. Excavated soil	1. Hazardous substances	1. Use proper equipment to monitor excavated soil for contaminates; ensure levels do not exceed PEL's for contaminates; Wear proper PPE
30. All activities	41. Slips/ Trips/ Falls 42. Hand injuries, cuts, or lacerations during manual handling of materials 43. Foot injuries 44. Back injuries 45. Traffic 46. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.)	47. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 48. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 49. Wear proper PPE (Langan approved safety shoes)

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
	47. High Noise levels 48. Overhead hazards 49. Heat Stress/ Cold Stress 50. Eye Injuries	50. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 51. Wear high visibility clothing & vest / Use cones or signs to designate work area 52. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 53. Wear hearing protection 54. Wear hard hat / Avoid areas were overhead hazards exist. 55. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 56. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: General Construction Activities
JSA Number: JSA010-01

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.

S – ***Stop,*** *what has changed?*
T – ***Think*** *about the task*
E – ***Evaluate*** *potential hazards*
P – ***Plan*** *safe approach*
S - ***Start*** *task /* ***Stop*** *& regroup*

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☒ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☒ Traffic Cones/Signs	☐ Life Vest/Jacket	
☐ Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
31. Transport equipment to work area	23. Back Strain 24. Slips/ Trips/ Falls 25. Traffic 26. Cuts/abrasions from equipment 27. Contusions from dropped equipment	6. Use proper lifting techniques / Use wheeled transport 7. Minimize distance to work area / Have unobstructed path to work area / Follow good housekeeping procedures 8. Wear proper PPE (high visibility vest or clothing) 9. Wear proper PPE (leather gloves, long sleeves) 10. Wear proper PPE (safety shoes)
32. Installation of piping from vapor wells to skid connections and from discharge pipping to effluent stack	11. Pinch fingers when connecting pipes 12. Slips/ Trips/ Falls 13. Machinery Hazards	3. Wear proper PPE (leather gloves) 4. Be aware of potential trip hazards / Practice good housekeeping procedures / Mark significant below-grade hazards (i.e. holes, trenches) with safety cones or spray paint 5. Wear proper PPE (safety vest) / Maintain safe distance from operating machinery
33. Remediation equipment installation	13. Back strain when lifting heavy equipment 14. Slips/ Trips/ Falls 15. Traffic	5. Use proper lifting techniques / Use wheeled transport / Minimize distance to vehicle 6. Be aware of potential trip hazards / Practice good housekeeping procedures / Mark significant below-grade hazards (i.e. holes, trenches) with safety cones or spray pain 7. Wear proper PPE (safety vest)
34. All activities	51. Slips/ Trips/ Falls 52. Hand injuries, cuts, or lacerations during manual handling of materials 53. Foot injuries 54. Back injuries 55. Traffic	57. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 58. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 59. Wear Langan approved safety shoes

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
4. All activities (cont'd)	56. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 57. High Noise levels 58. Overhead hazards 59. Heat Stress/ Cold Stress 60. Eye Injuries	60. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 61. Wear high visibility clothing & vest / Use cones or signs to designate work area 62. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 63. Wear hearing protection 64. Wear hard hat / Avoid areas were overhead hazards exist. 65. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 66. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: Site Inspection
JSA Number: JSA024-01

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.

S – *Stop,* what has changed?
T – *Think* about the task
E – *Evaluate* potential hazards
P – *Plan* safe approach
S - *Start* task / *Stop* & regroup

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☒ Rubber Boots
☒ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☒ Traffic Cones/Signs	☐ Life Vest/Jacket	
☐ Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
35. Jobsite Pre-briefing	28. None	17. Review JSA, SOP's, and discuss hazards that may be present and control measures for present hazards while on-site.

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
2. Working near railroads	1. Passing Trains. 2. Slip/Trips/Falls.	1. Wear reflective vest/ Stay away from tracks/ Do not cross tracks within 10 ft. of train car or when there is a train within view/listen for train horn. 2. Be aware of tripping hazards/ Follow good housekeeping procedures/ Mark significant hazards with spray paint or cones.
3. Walking around site	4. Uneven terrain 5. Wildlife: Stray animals, mice/rats, vectors (i.e. mosquitoes, bees, etc.) 6. Weather: Heat/cold stress 7. Slip/Trips/Falls 8. Foot injuries 9. Eye injuries	4. Pay attention to surrounding area (puddles, wet, frozen, uneven areas); Mark with cones or spray paint. 5. Use bug spray/ Avoid stray animals/Use repellant when needed. 6. Dress for the correct weather situation/ Use sunscreen or protective clothing in sunlight, layers in cold weather/ Drink plenty of fluids/ Take breaks when needed. 4. Be aware of tripping hazards/ Follow good housekeeping procedures/ Mark significant hazards with spray paint or cones. 5. Wear proper PPE (Langan approved safety shoes)/ Change wet socks during cold weather. 6. Wear proper PPE (safety glasses/goggles).
4. Working near road	1. Passing vehicles 2. Slip/Trips/Falls	1. Wear reflective vest/ Stay away from roadway/ Use buddy system/ Place signage or cones when needed. 2. Be aware of tripping hazards/ Follow good housekeeping procedures/ Mark significant hazards with spray paint or cones.
5. All activities	61. Slips/ Trips/ Falls 62. Hand injuries, cuts, or lacerations during manual handling of materials 63. Foot injuries 64. Back injuries 65. Traffic 66. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 67. High Noise levels 68. Overhead hazards 69. Heat Stress/ Cold Stress 70. Eye Injuries	67. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 68. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 69. Wear Langan approved safety shoes 70. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 71. Wear high visibility clothing & vest / Use cones or signs to designate work area 72. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 73. Wear hearing protection 74. Wear hard hat / Avoid areas were overhead hazards exist. 75. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 76. Wear safety glasses
Additional items.		

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: Building Construction Oversight
JSA Number: JSA006-01

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.

S – ***Stop,*** *what has changed?*
T – ***Think*** *about the task*
E – ***Evaluate*** *potential hazards*
P – ***Plan*** *safe approach*
S - ***Start*** *task / **Stop** & regroup*

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☒ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☒ Traffic Cones/Signs	☐ Life Vest/Jacket	
☐ Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
36. Transport equipment to work area	29. Back Strain 30. Slips/ Trips/ Falls 31. Traffic 32. Cuts/abrasions from equipment 33. Contusions from dropped equipment	11. Use proper lifting techniques / Use wheeled transport 12. Minimize distance to work area / Have unobstructed path to work area / Follow good housekeeping procedures 13. Wear proper PPE (high visibility vest or clothing) 14. Wear proper PPE (leather gloves, long sleeves) 15. Wear proper PPE (safety shoes)
37. Drilling/anchor bolt installation	14. Hazards associated with drilling, flying objects, heavy equipment, ground level hazards and dust 15. Slips/ Trips/ Falls 16. Hazards associated with concrete work	6. Maintain a safe distance from drilling operation / Wear proper PPE (hard hat, safety glasses, safety shoes, safety vest) 7. Be aware of potential trip hazards / Follow good housekeeping procedures / Mark significant below-grade hazards (i.e. holes, trenches) with safety cones or spray paint / Wear the proper PPE (safety shoes) 8. Maintain a safe distance from pouring operation
38. Steel building erection	16. Overhead hazards, falling objects 17. Pinching/crushing hazards	8. Wear proper PPE (hard had, safety glasses, safety vest) / Be aware of overhead hazards and maintain a safe distance of at least 10 ft. 9. All personnel should make others aware of moving objects or their intent to move objects / Avoid areas where pinching and crushing hazards are possible
39. All activities	71. Slips/ Trips/ Falls 72. Hand injuries, cuts, or lacerations during manual handling of materials 73. Foot injuries 74. Back injuries 75. Traffic	77. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 78. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 79. Wear Langan approved safety shoes

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
4. All activities (cont'd)	76. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 77. High Noise levels 78. Overhead hazards 79. Heat Stress/ Cold Stress 80. Eye Injuries	80. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 81. Wear high visibility clothing & vest / Use cones or signs to designate work area 82. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 83. Wear hearing protection 84. Wear hard hat / Avoid areas were overhead hazards exist. 85. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 86. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: Direct-Push Soil Borings
JSA Number: JSA004-01

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.

S – ***Stop,*** *what has changed?*
T – ***Think*** *about the task*
E – ***Evaluate*** *potential hazards*
P – ***Plan*** *safe approach*
S - ***Start*** *task /* ***Stop*** *& regroup*

PERSONAL PROTECTIVE EQUIPMENT REQUIRED:				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☒ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☒ Other: Half-face respirator, dust cartridges, PID (if applicable)				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
40. Move equipment to work site	34. Back strain when lifting equipment 35. Slips/ Trips/ Falls while moving equipment 36. Traffic (if applicable) 37. Pinched fingers or running over toes during GeoProbe set-up 38. Overturn drilling rig while transporting to loading dock on flat-bed tow truck	18. Use proper lifting technique (use legs for bending and lifting and not the back)/ Use wheeled transport for heavy equipment / Get assistance when handling loads greater than 50 lbs. / Minimize distance to vehicle 19. Use proper lifting technique (use legs for bending and lifting and not the back) / Use wheeled transport for heavy equipment / Get assistance when handling loads greater than 50 lbs. / Minimize distance to vehicle / Have unobstructed path to vehicle or collection point / Do not lift/walk with boxes that are heavy/difficult to lift 20. Wear high visibility safety vests or clothing / Exercise caution 21. Wear proper PPE (cut-resistant gloves) / Stay alert, be aware of geoprobe rig at all times 22. Drill rig should be parked in center of flat-bed tow truck / Emergency brake shall be used at all times during transport on the flat-bed truck/ All unnecessary personnel should stay away from the flat-bed truck during moving activities
41. Calibration of monitoring equipment	17. Skin or eye contact with calibration chemicals 18. Pinch fingers in monitoring equipment	10. Wear proper PPE (safety glasses/ goggles) 11. Wear proper PPE (leather gloves)
42. Set-up GeoProbe rig	18. Geoprobe rig movement	11. All field personnel should stay clear of the GeoProbe rig while moving / Use a spotter when backing up the GeoProbe
43. Advance GeoProbe rods below ground surface to desired depth	10. Underground utilities 11. High noise levels	7. Clean all subsurface soil borings to a minimum of 5 feet below grade 8. Wear proper PPE (hearing protection)
44. Remove and open acetate liner	81. Pinched fingers while removing macrocore	1. Wear proper PPE (nitrile gloves, cut-resistant or leather gloves 2. Wear proper PPE (cut-resistant or leather gloves)

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
5. Remove and open acetate liner (cont'd)	82. Cuts/lacerations when cutting acetate liner open 83. Exposure to hazardous vapors 84. Skin contact with contaminated soil	3. Do not place face over acetate liner when opening / Monitor hazardous vapors in air with PID / Upgrade PPE as necessary based on levels contained in the Health and Safety Plan 4. Wear proper PPE (nitrile gloves)
45. Sample Collections a) Monitor parameters b) Prepare sample containers and labels	1. Contact with potentially contaminated soil 2. Lacerations from broken sample bottles 3. Back strain while transporting full coolers 4. Internal exposure to contaminants and metals through inhalation of dust 5. Slips/ Trips/ Falls	1. Use monitoring devices / Wear proper PPE (safety glasses, nitrile gloves) 2. Do not over-tighten bottle caps / Handle bottles safely to prevent breakage 9. Use proper lifting techniques / Do not lift heavy loads without assistance 10. Avoid creating dust / If necessary, wear a half mask respirator with applicable dust cartridge / Inspect respirator for damage and cleanliness prior to use / Clean respirator after each use and store in a clean, secure location 11. Be alert / Follow good housekeeping procedures
46. Remove excess soil from acetate liner and place in 55-gallon drum (IF NOT PERFORMED BY LANGAN, REMOVE!)	1. Cuts/lacerations from acetate liner 2. Pinched fingers/hand while opening/closing drum 3. Skin contact with contaminated soil 4. Soil debris in eyes	1. Wear proper PPE (cut-resistant or leather gloves) 2. Wear proper PPE (cut-resistant or leather gloves) 3. Wear proper PPE (nitrile gloves) 4. Wear proper PPE (safety glasses)

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
8. Transport drums to central staging location (IF NOT PERFORMED BY LANGAN, REMOVE!)	1. Back, arm or shoulder strain from moving drums 2. Pinch fingers/hand in drum cart when moving drums 3. Pinch fingers/hand when operating lift-gate on vehicle 4. Contact with potentially contaminated groundwater when moving improperly sealed drums 5. Slips when moving drums 6. Drop drum on feet/toes	87. Use drum cart for moving drums / Use proper lifting techniques / Do not lift heavy loads without assistance 88. Wear proper PPE (cut-resistant or leather gloves) 89. Wear proper PPE (cut-resistant or leather gloves) 90. Wear proper PPE (nitrile gloves underneath work gloves) 91. Follow good housekeeping procedures / Ensure route to move drum and storage space is free from obstructions 92. Wear proper PPE (safety shoes) / Work in a safe manner to prevent dropped drum
9. All activities 9. All activities (cont'd)	1. Slips/ Trips/ Falls 2. Hand injuries, cuts, or lacerations during manual handling of materials 3. Foot injuries 4. Back injuries 5. Traffic 6. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 7. High Noise levels 8. Overhead hazards 9. Heat Stress/ Cold Stress 10. Eye Injuries	1. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 2. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 3. Wear Langan approved safety shoes 4. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 5. Wear high visibility clothing & vest / Use cones or signs to designate work area 6. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 7. Wear hearing protection 8. Wear hard hat / Avoid areas were overhead hazards exist. 9. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 10. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date

Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: Geophysical Investigation
JSA Number: JSA023-01

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.

S – *Stop,* what has changed?
T – *Think* about the task
E – *Evaluate* potential hazards
P – *Plan* safe approach
S - *Start* task / *Stop* & regroup

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☒ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☐ Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
47. Transport equipment to work area	39. Back/strain 40. Slip/Trip/Falls 41. Traffic 42. Cuts/abrasions/contusions from equipment	23. Use proper lifting techniques/Use wheeled transport 24. Minimize distance to work area/unobstructed path to work area/follow good housekeeping procedures 25. Wear proper PPE (high visibility vest or clothing) 26. Wear proper PPE (leather gloves, long sleeves, Langan approved safety shoes)
48. Supervision of subcontractor and all other activities	19. Slip/Trips/Falls 20. Hand injuries 21. Foot injuries 22. Back injuries/Strains 23. Traffic 24. Wildlife a. Wildlife b. Mice/rats c. Vectors (i.e. mosquitoes, bees, etc.) 7. Heat/Cold Stress	12. Be aware of potential trip hazards/follow good housekeeping procedures/mark significant below-grade hazards (i.e. holes, trenches, wires, ropes) with safety cones or spray paint. 13. Wear proper PPE (leather gloves)/watch wear you place your hands/inspect material or equipment for jagged, rough, or slippery surfaces/ watch for pinch points/ wipe off slippery, wet, or dirty items prior to handling. 14. Wear proper PPE (Langan approved safety shoes)/ Be aware of uneven terrain) 15. Use proper lifting techniques/ Buddy system when lifting/ use wheeled transport. 16. Wear proper PPE (high-visibility shirts and vests)/ use cones if appropriate/ notify equipment operators of work area. 17. Be aware of surroundings at all times for the presence of wildlife. a. Do not approach stray animals b. Carry animal repellant/ use if situation arises. c. Use bug spray when needed. 7. Wear proper attire for weather conditions (sunscreen, protective clothing in

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
		sunlight or layer clothing in cold weather)/ drink plenty of fluids/ take regular breaks.
49. All activities	85. Slips/ Trips/ Falls 86. Hand injuries, cuts, or lacerations during manual handling of materials 87. Foot injuries 88. Back injuries 89. Traffic 90. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 91. High Noise levels 92. Overhead hazards 93. Heat Stress/ Cold Stress 94. Eye Injuries	93. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 94. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 95. Wear Langan approved safety shoes 96. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 97. Wear high visibility clothing & vest / Use cones or signs to designate work area 98. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 99. Wear proper hearing protection 100. Wear hard hat / Avoid areas were overhead hazards exist. 101. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 102. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: Groundwater Sampling
JSA Number: JSA008-01

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.

S – *Stop,* what has changed?
T – *Think* about the task
E – *Evaluate* potential hazards
P – *Plan* safe approach
S - *Start* task / *Stop* & regroup

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☒ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☒ Other: Tyvek sleeves, Dermal Protection, PID				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
50. Transport equipment to work area	1. Back Strain 2. Slips/ Trips/ Falls 3. Traffic 4. Cuts/abrasions from equipment 5. Contusions from dropped equipment	1. Use proper lifting techniques / Use wheeled transport 2. Minimize distance to work area / Have unobstructed path to work area / Follow good housekeeping procedures 3. Wear proper PPE (high visibility vest or clothing) 4. Wear proper PPE (leather gloves, long sleeves) 5. Wear proper PPE (safety shoes)
51. Remove well cover	25. Scrape knuckles/hand 26. Strain wrist/bruise palm 27. Pinch fingers or hand	9. Wear proper PPE (leather gloves) 10. Using a hammer, tap the end of the wrench to loosen grip of bolts 11. Wear proper PPE (leather gloves)
52. Remove well cap and lock	19. Well can pops from pressure 20. Exposure to hazardous substances through inhalation or dermal exposure 21. Scrape knuckles/hand 22. Strain write/bruise palm	10. Remove cap slowly to relieve pressure / Do not place face over well when opening / Wear proper PPE (safety glasses) 11. Use direct air monitoring/reading instrument (i.e. PID) / Be familiar with and follow actions prescribed in the HASP / Wear proper PPE (nitrile gloves) 12. Wear proper PPE (leather gloves) 13. Using hammer, tap the end of the wrench to loosen grip
53. Measure head-space vapor levels	1. Exposure to hazardous substances through inhalation	1. Do not place face over well when collecting measurement
54. Remove dedicated tubing (if necessary)	1. Exposure to hazardous substances through inhalation or dermal exposure 2. Tubing swings around after removal	1. Wear proper PPE (nitrile gloves, Tyvek sleeves) 2. Wear proper PPE (safety glasses)
55. Set-up plastic sheeting for work site around the well	1. Lacerations when cutting plastic sheeting	1. Use scissors to cut plastic sheeting / Cut motions should always be away from body and body parts

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
56. Measure depth to water	1. Exposure to hazardous substances through inhalation or dermal exposure 2. Pinch fingers or hand in water level instrument	1. Wear proper PPE (nitrile gloves) 2. Wear proper PPE (leather gloves)
57. Calibrate monitoring equipment	1. Skin or eye contact with calibration chemicals 2. Pinch fingers or hand in monitoring equipment	1. Wear proper PPE (safety glasses, nitrile gloves) 2. Wear proper PPE (leather gloves) / Avoid pinch points
58. Install sampling pump in well	1. Hand injuries during installation of pump 2. Lacerations when cutting tubing 3. Back strain during installation of pump 4. Physical hazards associated with manual lifting of heavy equipment 5. Back strain from starting generator 6. Burns from hot exhaust from generator 7. Electrical shock from improper use of generator and pump 8. Contaminated water spray from loose connections	1. Wear proper PPE (leather gloves, nitrile gloves) 2. Use safety tubing cutter 3. Use proper lifting techniques 4. Use proper lifting techniques / Use wheeled transport for heavy equipment 5. Use arm when starting generator / Do not over-strain if generator does not start 6. Do not touch generator near exhaust / Use proper handle to carry / Allow generator to cool down before moving 7. Properly plug in pump to generator / Do not allow the pump or generator to contact water / Check for breaks in the cord 8. Check all tubing connections to ensure they are tight and secure

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
10. Purge water	1. Contact with potentially contaminated groundwater 2. Back strain from lifting buckets of water 3. Tripping potential on sample discharge lines and pump electric line	1. Wear proper PPE (safety glasses, nitrile gloves) 2. Use proper lifting techniques / Use wheeled transport 3. Organize discharge of electric line to keep out of way as much as possible / Mark potential tripping hazards with caution tape or safety cones
11. Sample water collection	1. Contact with potentially contaminated groundwater through dermal exposure 2. Contact with and burns from acid used for sample preservation 3. Tripping potential on sample discharge lines and pump electric line 4. Lacerations from broken sample bottles 5. Back strain when transporting coolers full of collected samples 6. Slips/ Trips/ Falls	1. Wear proper PPE (safety glasses, nitrile gloves) 2. Wear proper PPE (safety glasses, nitrile gloves) / Ensure sample bottle lids are secure before use and after sample collection 3. Organize line to keep out of the way as much as possible / Mark potential tripping hazards with caution tape or safety cones 4. Do not over-tighten bottle caps / Handle bottles safely to prevent breakage / Wrap glass bottles in bubble wrap, if possible 5. Use proper lifting techniques / Use wheeled transport / Seek assistance if coolers weight exceeds 50lbs. / Minimize distance to vehicle 6. Have unobstructed path to vehicle or collection point / Follow good housekeeping procedures / Do not lift/walk with coolers that are too heavy/difficult to lift
12. Remove pump and pack up equipment	1. Back strain when removing pump or lifting heavy equipment	1. Use proper lifting technique / Use wheeled transport for heavy equipment
13. Replace well cap and lock	1. Scrape fingers/hand 2. Strain wrist/bruise palm	1. Wear proper PPE (leather gloves) 2. Using hammer, tap the end of the well cap to tighten grip
14. Replace well cover	1. Scrape knuckles/hand 2. Strain write/bruise palm 3. Pinch fingers or hand	1. Wear proper PPE (leather gloves) 2. Using hammer, tap the end of the wrench to tighten the grip of the bolts 3. Wear proper PPE (leather gloves)
15. Transport drums to disposal staging location	1. Back, arm or shoulder strain from moving drums 2. Pinch hazard 3. Contact with potentially contaminated groundwater when moving improperly sealed drums 4. Slips/ Trips/ Falls when moving drum 5. Drop drum on feet/toes	1. Use drum cart for moving drums / Use proper lifting techniques / Obtain assistance, if needed 2. Wear proper PPE (leather gloves) 3. Wear proper PPE (nitrile gloves under leather gloves) / Properly seal drum to prevent leak 4. Ensure route to move drum to storage space is dry and free from obstructions 5. Wear proper PPE (safety shoes)
16. Place used PPE in designated disposal drum	1. Pressure build-up inside drum 2. Pinch hazard	1. Remove cap from bung hole in drum to relieve pressure 2. Wear proper PPE (leather gloves)
17. Decontaminate equipment	1. Splashing water/soap from decontamination 2. Contact with potentially contaminated groundwater through dermal exposure 3. Electrical shock from broken electric cords	1. Wear proper PPE (safety glasses) 2. Wear proper PPE (safety glasses, dermal protection) 3. Properly plug in pump to generator / Do not allow the pump or generator to contact water / Check for breaks in the cord
18. All activities	95. Slips/ Trips/ Falls 96. Hand injuries, cuts, or lacerations during manual handling of materials 97. Foot injuries 98. Back injuries 99. Traffic 100. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.)	103. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 104. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 105. Wear Langan approved safety shoes

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
	101. High Noise levels 102. Overhead hazards 103. Heat Stress/ Cold Stress 104. Eye Injuries	106. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 107. Wear high visibility clothing & vest / Use cones or signs to designate work area 108. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 109. Wear hearing protection 110. Wear hard hat / Avoid areas were overhead hazards exist. 111. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 112. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: **Well Installation**
JSA Number: **JSA019-01**

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.

S – ***Stop,*** *what has changed?*

T – ***Think*** *about the task*

E – ***Evaluate*** *potential hazards*

P – ***Plan*** *safe approach*

S - ***Start*** *task /* ***Stop*** *& regroup*

PERSONAL PROTECTIVE EQUIPMENT REQUIRED:				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☒ Other: PID, Tyvek sleeves				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
59. Move equipment to work site	43. Back strain when lifting equipment 44. Slips/ Trips/ Falls while moving equipment 45. Traffic (if applicable) 46. Pinched fingers or running over toes during GeoProbe set-up 47. Overturn drilling rig while transporting to loading dock on flat-bed tow truck	27. Use proper lifting technique (use legs for bending and lifting and not the back)/ Use wheeled transport for heavy equipment / Get assistance when handling loads greater than 50 lbs. / Minimize distance to vehicle 28. Use proper lifting technique (use legs for bending and lifting and not the back) / Use wheeled transport for heavy equipment / Get assistance when handling loads greater than 50 lbs. / Minimize distance to vehicle / Have unobstructed path to vehicle or collection point / Do not lift/walk with boxes that are heavy/difficult to lift 29. Wear high visibility safety vests or clothing / Exercise caution 30. Wear proper PPE (cut-resistant gloves) / Stay alert, be aware of geoprobe rig at all times 31. Drill rig should be parked in center of flat-bed tow truck / Emergency brake shall be used at all times during transport on the flat-bed truck/ All unnecessary personnel should stay away from the flat-bed truck during moving activities
60. Calibration of monitoring equipment	28. Skin or eye contact with calibration chemicals 29. Pinch fingers in monitoring equipment	18. Wear proper PPE (safety glasses/ goggles) 19. Wear proper PPE (leather gloves)
20. Set-up GeoProbe rig	23. Geoprobe rig movement	12. All field personnel should stay clear of the GeoProbe rig while moving / Use a spotter when backing up the GeoProbe
21. Advance GeoProbe rods below ground surface to desired depth	12. Underground utilities 13. High noise levels	12. Clean all subsurface soil borings to a minimum of 5 feet below grade 13. Wear proper PPE (hearing protection)

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
22. Remove and open acetate liner 5. Remove and open acetate liner (cont'd)	105. Pinched fingers while removing macrocore 106. Cuts/lacerations when cutting acetate liner open 107. Exposure to hazardous vapors 108. Skin contact with contaminated soil	5. Wear proper PPE (nitrile gloves, cut-resistant or leather gloves 6. Wear proper PPE (cut-resistant or leather gloves) 7. Do not place face over acetate liner when opening / Monitor hazardous vapors in air with PID / Upgrade PPE as necessary based on levels contained in the Health and Safety Plan 8. Wear proper PPE (nitrile gloves)
6. Remove excess soil from acetate liner and place in 55-gallon drum (IF NOT PERFORMED BY LANGAN, REMOVE!)	5. Cuts/lacerations from acetate liner 6. Pinched fingers/hand while opening/closing drum 7. Skin contact with contaminated soil 8. Soil debris in eyes	5. Wear proper PPE (cut-resistant or leather gloves) 6. Wear proper PPE (cut-resistant or leather gloves) 7. Wear proper PPE (nitrile gloves) 8. Wear proper PPE (safety glasses)
7. Attach hollow-stem augers to the GeoProbe rig; Advance augers and attach additional augers until desired depth is reached	1. Strain wrist/bruise palm 2. Pinched fingers 3. Back Strain 4. Clothing entanglement 5. Carbon monoxide poisoning 6. Bruise toes/foot 7. High noise levels 8. Skin contact with contaminated soil	1. Wear proper PPE (cut-resistant or leather gloves) 2. Wear proper PPE (cut-resistant or leather gloves) 3. Use proper lifting techniques 4. Wear proper work attire(no loose clothing/strings) 5. Properly ventilate work area 6. Wear proper PPE (safety shoes) 7. Wear proper PPE (hearing protection) 8. Wear proper PPE (Tyvek sleeves, nitrile gloves)
8. Install monitoring well	1. Pinched fingers 2. Lacerations/abrasions 3. Back Strain	1. Wear proper PPE (cut-resistant or leather gloves) 2. Wear proper PPE (cut-resistant or leather gloves) 3. Use proper lifting techniques
9. Tremie-grout annulus space above bentonite seal	1. Back strain 2. Pinched fingers	1. Use proper lifting techniques 2. Wear proper PPE (cut-resistant or leather gloves)
10. Install flush-mount monitoring well pad	1. Splashed concrete 2. Pinched fingers 3. Cuts/lacerations	1. Wear proper PPE (safety glasses) 2. Wear proper PPE (cut-resistant or leather gloves) 3. Wear proper PPE (cut-resistant or leather gloves)
11. Decontaminate equipment	1. Splashing water/soap 2. Contact with potentially contaminated groundwater/soil through dermal exposure 3. Electrical shock from broken electric cords	1. Wear proper PPE (safety glasses) 2. Wear proper PPE (safety glasses, dermal protection) 3. Properly plug in pump to generator / Do not allow the pump or generator to contact water / Check for breaks in the cord
12. Transport drums to central staging location (IF NOT PERFORMED BY LANGAN, REMOVE!)	7. Back, arm or shoulder strain from moving drums 8. Pinch fingers/hand in drum cart when moving drums 9. Pinch fingers/hand when operating lift-gate on vehicle 10. Contact with potentially contaminated groundwater when moving improperly sealed drums 11. Slips when moving drums 12. Drop drum on feet/toes	113. Use drum cart for moving drums / Use proper lifting techniques / Do not lift heavy loads without assistance 114. Wear proper PPE (cut-resistant or leather gloves) 115. Wear proper PPE (cut-resistant or leather gloves) 116. Wear proper PPE (nitrile gloves underneath work gloves) 117. Follow good housekeeping procedures / Ensure route to move drum and storage space is free from obstructions 118. Wear proper PPE (safety shoes) / Work in a safe manner to prevent dropped drum

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
13. All activities 13. All activities (cont'd)	11. Slips/ Trips/ Falls 12. Hand injuries, cuts, or lacerations during manual handling of materials 13. Foot injuries 14. Back injuries 15. Traffic 16. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 17. High Noise levels 18. Overhead hazards 19. Heat Stress/ Cold Stress 20. Eye Injuries	11. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 12. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 13. Wear Langan approved safety shoes 14. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 15. Wear high visibility clothing & vest / Use cones or signs to designate work area 16. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 17. Wear hearing protection 18. Wear hard hat / Avoid areas were overhead hazards exist. 19. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 20. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: Monitoring Well Development
JSA Number: JSA026-01

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.

S – *Stop,* what has changed?
T – *Think* about the task
E – *Evaluate* potential hazards
P – *Plan* safe approach
S - *Start* task / *Stop* & regroup

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☐ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☒ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☒ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☒ Other: Tyvek Sleeves				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
61. Transport equipment to work area	48. Back Strains 49. Slips/Trips/Falls 50. Traffic 51. Cuts/Abrasions/Contusions from equipment	32. Use proper lifting techniques/ Use wheeled transport/ use buddy system when lifting equipment. 33. Minimize distance from work area/ unobstructed path to collection points and vehicle/ Follow good housekeeping procedures. 34. Wear high-visibility vest or clothing/Exercise caution/ Use traffic cones or signage if needed. 35. Wear proper PPE (leather gloves, long sleeves, Langan approved safety shoes).
62. Measure depth of water	30. Exposure to hazardous substances 31. Pinched fingers	23. Wear proper PPE (Nitrile gloves, Safety glasses/Face shield). 24. Wear proper PPE (cut-resistant gloves).
63. Install Tremie pipe in the monitoring well and connect to water source.	24. Hand injuries during installation (pinched fingers/hands). 25. Back strain from holding Tremie pipe. 26. High pressure water spray.	13. Wear proper PPE (Nitrile gloves/cut-resistant gloves). 14. Use proper lifting techniques/ Use two personnel when lowering pump greater than 80 feet. 15. Ensure all hose connections are tight and secure/ Use proper PPE (face shield and safety glasses).
64. Install pump in to well. a. Connect pump to sample tubing. b. Lower pump to desired depth in well. c. Connect sample tubing to flow cell. d. Connect pump to power source	14. Hand injuries during pump installation and sample tubing cutting. 15. Back strain 16. Electric shock 17. Exhaust gases from generator 18. Burns from hot equipment	14. Wear proper PPE when installing pump and cutting sample tubing (Nitrile and cut-resistant gloves)/ Use tubing cutter. 15. Proper lifting techniques/ Two personnel when installing pump at depths greater than 80 feet/ Use buddy when lifting heavy loads (pump, generator)/Use wheeled transport. 16. Ensure equipment is (LO/TO: locked out/tagged out) prior to preforming any electrical connections/ Inspect wires for frays or cuts/Ensure generator is properly grounded prior to starting.

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
(generator) e. Turn on power source (generator)		17. Position generator so that exhaust is flowing away from work area. 18. Do not touch exhaust or any hot part of generator/ Allow equipment time to cool down prior to carrying/ Use proper PPE (long sleeves, leather gloves)
65. Develop monitoring well. a. Jet water into well using Tremie pipe. b. Turn pump on and adjust to desired flow rate. c. Surge pump up and down well to remove sediment from screen. d. Containerize all purge water from well.	109. Hand injuries 110. Face injuries 111. Contaminated spray from water	119. Wear proper PPE (cut-resistant gloves and nitrile gloves). 120. Wear proper PPE (face shield and safety glasses)/do not stand over well opening. 121. Wear proper PPE (Face shield and safety goggles)/Tyvek over garments/ Ensure all connections are secure and tight/ Tubing outlet is contained in an overflow container.
66. Drum staging area.	1. Back, Arm, and shoulder strain. 2. Pinch points 3. Cross contamination 4. Slip/Trips/Falls	1. Use proper lifting techniques/ Use drum carts when moving drums/ use buddy system for moving of drums if needed/Move drums shortest distance needed. 2. Keep fingers and feet away from pinch points/ Use proper PPE (cut-resistant gloves, Langan approved safety shoes) 3. Use proper PPE (Nitrile gloves, Tyvek sleeves) 4. Ensure pathway is clear prior to moving equipment/ Mark all hazards/ Use additional person as a spotter if needed.
67. Equipment pack-up	1. Back Strains 2. Slips/Trips/Falls 3. Traffic 4. Cuts/Abrasions/Contusions from equipment.	1. Use proper lifting techniques/ Use wheeled transport/ use buddy system when lifting equipment. 2. Minimize distance from work area/ Unobstructed path to collection points and vehicle/ Follow good housekeeping procedures. 3. Wear high-visibility vest or clothing/Exercise caution/ Use traffic cones or signage if needed. 122. Wear proper PPE (leather gloves, long sleeves, Langan approved safety shoes).
68. All activities	1. Slips/ Trips/ Falls 2. Hand injuries, cuts, or lacerations during manual handling of materials 3. Foot injuries 112. Back injuries 113. Traffic 114. Wildlife: Stray dogs, Mice/rats, Vectors (i.e., mosquitoes, bees, etc.) 115. High Noise levels 116. Overhead hazards 117. Heat Stress/ Cold Stress 118. Eye Injuries	1. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 2. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery, or dirty objects before handling / Wear leather/ cut-resistant gloves 3. Wear Langan approved safety shoes 4. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 5. Wear high visibility clothing & vest / Use cones or signs to designate work area 6. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 7. Wear hearing protection 8. Wear hard hat / Avoid areas where overhead hazards exist. 9. Wear proper attire for weather conditions (sunscreen or protective clothing

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
		in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 10. Wear safety glasses.
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: Groundwater/Product Purging/Sampling with Bailer
JSA Number: JSA053

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last-Minute Risk Assessment.

S – ***Stop,*** *what has changed?*
T – ***Think*** *about the task*
E – ***Evaluate*** *potential hazards*
P – ***Plan*** *safe approach*
S - ***Start*** *task /* ***Stop*** *& regroup*

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☒ Safety Goggles	☒ Face Shield	☒ Nitrile Gloves	☒ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☒ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☒ Traffic Cones/Signs	☐ Life Vest/Jacket	
☒ Other: Tyvek sleeves, Dermal Protection, PID, absorbent pads				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
69. Transport equipment to work area	6. Back Strain 7. Slips/ Trips/ Falls 8. Traffic 9. Cuts/abrasions from equipment 10. Contusions from dropped equipment	6. Use proper lifting techniques / Use wheeled transport. 7. Minimize distance to work area / Have unobstructed path to work area / Follow good housekeeping procedures. 8. Wear proper PPE (high visibility vest or clothing) 9. Wear proper PPE (leather gloves, long sleeves) 10. Wear proper PPE (safety shoes)
70. Remove well cover	32. Scrape knuckles/hand 33. Strain wrist/bruise plan 34. Pinch fingers or hand	12. Wear proper PPE (leather gloves) 13. Using a hammer, tap the end of the wrench to loosen grip of bolts. 14. Wear proper PPE (leather gloves)
71. Remove well cap and lock	27. Well can pops from pressure. 28. Exposure to hazardous substances through inhalation or dermal exposure 29. Scrape knuckles/hand 30. Pinch points 31. Strain write/bruise palm	14. Remove cap slowly to relieve pressure / Do not place face over well when opening / Wear proper PPE (safety glasses, face shield, hand protection) 15. Use direct air monitoring/reading instrument (i.e., PID) / Be familiar with and follow actions prescribed in the HASP / Wear proper PPE (nitrile gloves) 16. Wear proper PPE (leather gloves) 17. Using hammer, tap the end of the wrench to loosen grip
72. Measure head-space vapor levels	2. Exposure to hazardous substances through inhalation	2. Do not place face over well when collecting measurement
73. Set-up plastic sheeting/absorbent pads	2. Lacerations when cutting plastic sheeting/absorbent pads.	2. Use scissors to cut plastic sheeting/absorbent pads / Cut motions should always be away from body and body parts

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
for work site around the well		
74. Lower Bailer sleeve into well	7. Repetitive motion injury (pulled arm/back muscles) 8. Dehydration	7. Take breaks while lowering bailer into well/ Use a mechanical device to lower bailer into well/ Rotate employees (take turns conducting the manual labor portion) 8. Take breaks and drink water.

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
7. Purge/Sample water/product collection	1. Contact with potentially contaminated groundwater or product through dermal exposure 2. Contact with and burns from acid used for sample preservation 9. Tripping potential on sampling lanyard 10. Lacerations from broken sample bottles 11. Back strain when transporting coolers full of collected samples. 12. Slips/ Trips/ Falls	1. Wear proper PPE (safety glasses, nitrile gloves, safety shield, Tyvek) 2. Ensure sample bottle lids are secure before use and after sample collection 3. Organize lanyard to keep out of the way as much as possible / Mark potential tripping hazards with caution tape or safety cones 9. Do not over-tighten bottle caps / Handle bottles safely to prevent breakage / Wrap glass bottles in bubble wrap, if possible 10. Use proper lifting techniques / Use wheeled transport / Seek assistance if coolers weight exceeds 50lbs. / Minimize distance to vehicle. 11. Have unobstructed path to vehicle or collection point / Follow good housekeeping procedures / Do not lift/walk with coolers that are too heavy/difficult to lift
8. Retrieval of bailer	9. Repetitive motion injury (pulled arm/back muscles) 10. Dehydration	9. Take breaks while retrieving bailer out of the well/ Use a mechanical device to raise bailer out of well/ Rotate employees (take turns conducting the manual labor portion) 10. Take breaks and drink water.
9. Pack-up equipment	2. Back strain when removing or lifting heavy equipment	2. Use proper lifting technique / Use wheeled transport for heavy equipment
10. Replace well cap and lock	3. Scrape fingers/hand 4. Strain wrist/bruise palm	3. Wear proper PPE (leather gloves) 4. Using hammer, tap the end of the well cap to tighten grip
11. Replace well cover	4. Scrape knuckles/hand 5. Strain write/bruise palm. 6. Pinch fingers or hand	4. Wear proper PPE (leather gloves) 5. Using hammer, tap the end of the wrench to tighten the grip of the bolts. 6. Wear proper PPE (leather gloves)
12. Place used PPE in designated disposal drum	3. Pressure build-up inside drum 4. Pinch hazard	3. Remove cap from bung hole in drum to relieve pressure. 4. Wear proper PPE (leather gloves) 5. Product drums may require additional spill protection/electrical grounding, check local regulations
13. Decontaminate equipment	4. Splashing water/soap from decontamination 5. Contact with potentially contaminated groundwater through dermal exposure.	4. Wear proper PPE (safety glasses) 5. Wear proper PPE (safety glasses, dermal protection)

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
14. All activities	119. Slips/ Trips/ Falls 120. Hand injuries, cuts, or lacerations during manual handling of materials 121. Foot injuries 122. Back injuries 123. Traffic 124. Wildlife: Stray dogs, Mice/rats, Vectors (i.e., mosquitoes, bees, etc.) 125. High Noise levels 126. Overhead hazards 127. Heat Stress/ Cold Stress 128. Eye Injuries	123. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards. 124. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery, or dirty objects before handling / Wear leather/ cut-resistant gloves. 125. Wear Langan approved safety shoes. 126. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible. 127. Wear high visibility clothing & vest / Use cones or signs to designate work area. 128. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed. 129. Wear hearing protection 130. Wear hard hat / Avoid areas where overhead hazards exist. 131. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress. 132. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	**Sign Name**	**Date**
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: Test Pits
JSA Number: JSA016-01

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.

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T – ***Think*** *about the task*
E – ***Evaluate*** *potential hazards*
P – ***Plan*** *safe approach*
S - ***Start*** *task /* ***Stop*** *& regroup*

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☐ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☐ Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
75. Transport equipment to work area	52. Back Strain 53. Slips/ Trips/ Falls 54. Traffic 55. Cuts/abrasions from equipment 56. Contusions from dropped equipment	16. Use proper lifting techniques / Use wheeled transport 17. Minimize distance to work area / Have unobstructed path to work area / Follow good housekeeping procedures 18. Wear proper PPE (high visibility vest or clothing) 19. Wear proper PPE (leather gloves, long sleeves) 20. Wear proper PPE (safety shoes)
76. Digging Test Pit	35. Back Strain 36. Unstable walls of excavation	15. Observe proper digging technique. Ensure spoil pile and equipment are at least 2 feet from edge of excavation. 16. Excavate test pit in a stepped manor.
77. All activities	129. Slips/ Trips/ Falls 130. Hand injuries, cuts, or lacerations during manual handling of materials 131. Foot injuries 132. Back injuries 133. Traffic 134. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 135. High Noise levels 136. Overhead hazards 137. Heat Stress/ Cold Stress 138. Eye Injuries	133. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 134. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 135. Wear Langan approved safety shoes 136. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 137. Wear high visibility clothing & vest / Use cones or signs to designate work area 138. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
3. All activities (cont'd)		139. Wear hearing protection 140. Wear hard hat / Avoid areas were overhead hazards exist. 141. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 142. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

ATTACHMENT H

TAILGATE SAFETY BRIEFING FORM

LANGAN TAILGATE SAFETY BRIEFING

Date:_____ Time: _____

Leader:_____ Location:_____

Work Task:

_____

_____

SAFETY TOPICS (*provide some detail of discussion points*)

Chemical Exposure Hazards and Control:_____

_____

Physical Hazards and Control: _____

Air Monitoring: _____

PPE: _____

_____

Communications:_____

Safe Work Practices: _____

_____

Emergency Response: _____

Hospital/Medical Center Location: _____

Phone Nos.: _____

Other: _____

FOR FOLLOW-UP (the issues, responsibilities, due dates, etc.**)**

_____

_____

_____

ATTENDEES

PRINT NAME	COMPANY	SIGNATURE

ATTACHMENT I

THE CITY OF NEW YORKEXECUTIVE ORDER NO. 74

Langan employees and their direct hire contractors will comply with all provisions of the New York City Executive Order No. 74 as signed by the Mayor on July 31, 2021. Specifically, effective August 2, 2021

- Will don face masks while on-site at all times; and
- Provide proof upon demand of full vaccination status.

A copy of the New York City Executive Order No. 74 is provided on the following pages.

TABLES

TABLE 1
TASK HAZARD ANALYSES

Task	Hazard	Description	Control Measures	First Aid
1.3.1 – 1.3.22	Contaminated Soil or Groundwater-Dermal Contact	Contaminated water spills on skin, splashes in eyes; contact with contaminated soil/fill during construction activities or sampling.	Wear proper PPE; follow safe practices, maintain safe distance from construction activities	See Table 2, seek medical attention as required
1.3.1 – 1.3.22	Lacerations, abrasions, punctures	Cutting bailer twine, pump tubing, acetate liners, etc. with knife; cuts from sharp site objects or previously cut piles, tanks, etc.; Using tools in tight spaces	Wear proper PPE; follow safe practices	Clean wound, apply pressure and/or bandages; seek medical attention as required.
1.3.1 – 1.3.22	Contaminated Media Inhalation	Opening drums, tanks, wells; vapors for non-aqueous phase liquids or other contaminated site media; dust inhalation during excavation; vapor accumulation in excavation	Follow air monitoring plan; have quick access to respirator, do not move or open unlabeled drums found at the site, maintain safe distance from construction activities	See Table 2, seek medical attention as required
1.3.1 – 1.3.22	Lifting	Improper lifting/carrying of equipment and materials causing strains	Follow safe lifting techniques. Langan employees are not to carry contractor equipment or materials	Rest, ice, compression, elevation; seek medical attention as required
1.3.1 – 1.3.22	Slips, trips, and falls	Slips, trips, and falls due to uneven surfaces, cords, steep slopes, debris, and equipment in work areas	Good housekeeping at site; constant awareness and focus on the task; avoid climbing on stockpiles; maintain safe distance from construction activities and excavations; avoid elevated areas over six feet unless fully accredited in fall protection and wearing an approved fall protection safety apparatus	Rest, ice, compression, elevation; seek medical attention as required
1.3.1 – 1.3.22	Noise	Excavation equipment, hand tools, drilling equipment.	Wear hearing protection; maintain safe distance from construction activities	Seek medical attention as required
1.3.1 – 1.3.22	Falling objects	Soil material, tools, etc. dropping from drill rigs, front-end loaders, etc.	Hard hats to be worn at all times while in work zones; maintain safe distance from construction activities and excavations	Seek medical attention as required
1.3.1 – 1.3.22	Underground/ overhead utilities	Excavation equipment, drill rig auger contacts underground object; boom touches overhead utility	"One Call" before dig; follow safe practices; confirm utility locations with contractor; wear proper PPE; maintain safe distance from construction activities and excavations	Seek medical attention as required
1.3.1 – 1.3.22	Insects (bees, wasps, hornet, mosquitoes, and spider)	Sings, bites	Insect Repellent; wear proper protective clothing (work boots, socks, and light-colored pants); field personnel who may have insect allergies (e.g., bee sting) should provide this information to the HSO or FSO prior to commencing work and will have allergy medication on site.	Seek medical attention as required
1.3.1 – 1.3.22	Vehicle traffic / Heavy Equipment Operation	Vehicles unable to see workers on site, operation of heavy equipment in tight spaces, equipment failure, malfunctioning alarms	Wear proper PPE, especially visibility vest; use a buddy system to look for traffic; rope off area of work with cones and caution tape or devices at points of hazard, maintain safe distance from construction activities and equipment	Seek medical attention as required

TABLE 2
CONTAMINANT HAZARDS OF CONCERN

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	1,1,2-Trichloroethane 1,1,2-TCA 1,1,2-Trichloroethane Ethane trichloride β-Trichloroethane Vinyl trichloride	79-00-5	PID	10 ppm 100 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation eyes, nose; central nervous system depression; liver, kidney damage; dermatitis	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention
1.3.1 – 1.3.22	1,1′-Biphenyl 1,1-Biphenyl Biphenyl Phenyl benzene Diphenyl	92-52-4	None	1 mg/m^3 100 mg/m^3	Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, throat; headache, nausea, lassitude (weakness, exhaustion), numb limbs; liver damage	Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	1,2,4-Trichlorobenzene Unsym-Trichlorobenzene 1,2,4-Trichlorobenzol	120-82-1	NA	None None	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation eyes, skin, mucous membrane; In Animals: liver, kidney damage; possible teratogenic effects	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	1,2,4-Trimethylbenzene	95-63-6	PID	None None	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat, respiratory system; bronchitis; hypochromic anemia; headache, drowsiness, lassitude (weakness, exhaustion), dizziness, nausea, incoordination; vomiting, confusion; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	1,2-Dibromo-3-chloropropane Dibromochloropropane DBCP	96-12-8	PID	None None	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation eyes, skin, nose, throat; drowsiness; nausea, vomiting; pulmonary edema; liver, kidney injury; sterility; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	1,2-Dichlorobenzene	95-50-1	PID	50 ppm 200 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eye, swelling periorbital (situated around the eye); profuse rhinitis; headache, anorexia, nausea, vomiting; weight loss, jaundice, cirrhosis; in animals: liver, kidney injury; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	1,2-Dichlorotetrafluoroethane Dichlorotetrafluorethane 1,2-Dichloro-1,1,2,2-tetrafluoroethane Freon® 114 Freon 114 Genetron® 114 Halon® 242 Refrigerant 114 1,2-Dichloro-1,1,2,2-tetrafluorethane	76-14-2	PID	1000 ppm 15000 ppm	Groundwater Soil Vapor	inhalation, skin, and/or eye contact (liquid)	irritation respiratory system; asphyxia; cardiac arrhythmias, cardiac arrest; liquid: frostbite	Eye: Frostbite Skin: Frostbite Breathing: Respiratory support
1.3.1 – 1.3.22	1,2-Diphenylhydrazine Hydrazobenzène Diphénylhydrazine N,N'-Bianiline	122-66-7	NA	NA NA	Groundwater Soil	Inhalation, ingestion, skin, and/or eye contact	Irritant to eyes, skin, mucous membranes, and respiratory system. May be harmful by ingestion, skin absorption and inhalation	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	1,3,5-Trimethylbenzene Mesitylene sym-Trimethylbenzene	108-67-8	PID	None None	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat, respiratory system; bronchitis; hypochromic anemia; headache, drowsiness, lassitude (weakness, exhaustion), dizziness, nausea, incoordination; vomiting, confusion; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	1,3-Butadiene Biethylene Bivinyl Butadiene Divinyl Erythrene Vinylethylene	106-99-0	PID	1 ppm 2000 ppm	Vapor	inhalation, skin, and/or eye contact (liquid)	irritation to the eyes, nose, throat; drowsiness, dizziness; liquid: frostbite; teratogenic, reproductive effects; [potential occupational carcinogen]	Eye: Frostbite Skin: Frostbite Breathing: Respiratory support

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	1,3-Dichlorobenzene m-Dichlorobenzol; m-Phenylene dichloride m-dichlorobenzene	541-73-1	PID	None None	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, swelling periorbital (situated around the eye); profuse rhinitis; headache, anorexia, nausea, vomiting; weight loss, jaundice, cirrhosis; in animals: liver, kidney injury; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	1,4-Dichlorobenzene para-Dichlorobenzene p-Dichlorobenzene 1,4-Dichlorobenzene 1,4-DCB para-Dichlorobenzene p-Dichlorobenzene p-DCB PDB Paramoth Para crystals Paracide Dichlorocide	106-46-7	PID	75 ppm 150 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, swelling periorbital (situated around the eye); profuse rhinitis; headache, anorexia, nausea, vomiting; weight loss, jaundice, cirrhosis; in animals: liver, kidney injury; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	1,4-Dioxane 1,4-Dioxacyclohexane [1,4]Dioxane p-Dioxane [6]-crown-2 Diethylene dioxide Diethylene ether Dioxan Dioxane 1,4-Dioxane	123-91-1	PID	100 ppm 500 ppm	Groundwater Soil Vapor	Inhalation, ingestion, skin, and/or eye contact	Irritant to eyes, skin, mucous membranes, and respiratory system. May be harmful by ingestion, skin absorption and inhalation	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	2-(N-Methylperfluorooctanesulfonamido)acetic acid N-MeFOSAA N-methylperfluorooctane sulfonamidoacetic acid 2-(N-methyl-perfluorooctane sulfonamido) acetic acid Glycine N-[(heptadecafluorooctyl)sulfonyl]-N-methyl- N-methyl perfluorooctane-sulfonamidoacetic acid NMeFOSAA MeFOSAA	2355-31-9	NA	NA NA	Groundwater Soil	inhalation, skin, or eye contact, ingestion	irritation to eyes with eye damage, skin, causing rash, redness or burning, irritation to nose, throat, and lungs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	2,4-Dimethylphenol 2,4-Xylenol m-Xylenol 1-Hydroxy-2,4-dimethylbenzene 2,4-Dimethylphenol 4-Hydroxy-1,3-dimethylbenzene 4,6-Dimethylphenol 1,3-Dimethyl-4-hydroxybenze	105-67-9	None	NA NA	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, mucous membrane; headache, narcosis, coma; dermatitis; in animals: liver, kidney damage	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	2,6-Dinitrotoluene 2-Methyl-1,3-dinitrobenzene 2,6-DNT 2-methyl-1,3-dinitrobenzene 1-Methyl-2,6-dinitrobenzene 2,4-dinitromethylbenzene	606-20-2	PID	1.5 mg/m3	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	headache, weakness, nausea or dizziness, affect the nervous system causing fatigue, nausea, vomiting, drowsiness, and personality changes (irritability, anxiety, confusion and depression); shortness of breath and collapse. Can burn eyes and skin.	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	2-Butanone Ethyl methyl ketone MEK Methyl acetone Methyl ethyl ketone	78-93-3	PID	200 ppm 3000 ppm	Soil Groundwater Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose; headache; dizziness; vomiting; dermatitis	Eye: Irrigate immediately Skin: Water wash immediately Breathing: Fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.22	2-Hexanone Butyl methyl ketone MBK Methyl butyl ketone Methyl n-butyl ketone	591-78-6	PID	100 ppm 1600 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, nose; peripheral neuropathy: lassitude (weakness, exhaustion), paresthesia; dermatitis; headache, drowsiness	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	2-Methylnaphthalene β-methylnaphthalene	91-57-6	PID	NA NA	Groundwater Soil Vapor	inhalation, ingestion or skin, absorption, eye contact	irritation to the skin, eyes, mucous membranes, and upper respiratory tract. It may also cause headaches, nausea, vomiting, diarrhea, anemia, jaundice, euphoria, dermatitis, visual disturbances, convulsions and comatose	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	4,4'-DDD Dichlorodiphenyldichloroethane 1,1'-(2,2-Dichloroethylidene)bis (4-chlorobenzene) p,p'-DDD	72-54-8	None	NA NA	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin; paresthesia tongue, lips, face; tremor; anxiety, dizziness, confusion, malaise (vague feeling of discomfort), headache, lassitude (weakness, exhaustion); convulsions; paresis hands; vomiting; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	4-Isopropyltoulene 1-Methyl-4-(1-methylethyl)benzene 4-Isopropyltoluene; 4-Methylcumene; 1-Methyl-4-isopropylbenzene Dolcymene Camphogen Paracymene Cymene p-Cymene p-Isopropyltoluene	99-87-6	PID	NA NA	Soil Groundwater Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, mucous membrane; dermatitis; headache, narcosis, coma	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	4-Methyl-2-pentanone Hexone Isobutyl methyl ketone Methyl isobutyl ketone MIBK	108-10-1	PID	100 ppm 500 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, mucous membrane; headache, narcosis, coma; dermatitis; in animals: liver, kidney damage	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Acenaphthene 1,2-Dihydroacenaphthylene 1,8-Ethylenenaphthalene peri-Ethylenenaphthalene Naphthyleneethylene Tricyclododecapentaene	83-32-9	PID	NA NA	Soil	inhalation, ingestion, skin, and/or eye contact,	irritation to the skin, eyes, mucous membranes, and upper respiratory tract; If ingested, it can cause vomiting	Eye: Irrigate immediately Skin: Soap wash immediately, if redness or irritation develop, seek medical attention immediately Breathing: Move to fresh air Swallow: do not induce vomiting, seek medical attention immediately
1.3.1 – 1.3.22	Acenaphthylene Cycopental(de)naphthalene, Acenaphthalene	208-96-8	PID	NA NA	Soil	inhalation, ingestion, skin, and/or eye contact	irritation to the skin, eyes, mucous membranes, and upper respiratory tract	Eye: Irrigate immediately, seek medical attention immediately, Skin: Soap wash immediately, if redness or irritation develop, seek medical attention immediately Breathing: Move to fresh air Swallow: do not induce vomiting, seek medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Acetone Dimethyl ketone Ketone propane 2-Propanone	67-64-1	PID	1000 ppm 2500 ppm	Groundwater Soil	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, nose, throat; headache, dizziness, central nervous system depression; dermatitis	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Aldrin 1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-hexahydro-endo-1,4-exo-5,8-dimethanonaphthalene HHDN Octalene	309-00-2	PID	0.25 ppm 5 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	headache, dizziness; nausea, vomiting, malaise (vague feeling of discomfort); myoclonic jerks of limbs; colonic, tonic convulsions; coma; hematuria (blood in the urine), azotemia; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Alpha-Chlordane Alpha Chlordane a-Chlordane	5103-71-9	None	0.5 mg/m^3 100 mg/m^3	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	Blurred vision; confusion; ataxia, delirium; cough; abdominal pain, nausea, vomiting, diarrhea; irritability, tremor, convulsions; anuria	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Aluminum	7429-90-5	None	0.5 mg/m3 50 mg/m3	Soil	inhalation, skin, and/or eye contact	irritation to the eyes, skin, respiratory system	Eye: Irrigate immediately Breathing: Fresh air

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Anthracene	120-12-7	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Soil	inhalation, skin, or eye contact, ingestion	irritation to the skin, eyes, mucous membranes, and upper respiratory tract, abdominal pain if ingested.	Eye: Irrigate immediately, seek medical attention immediately, Skin: Soap wash immediately, Breathing: Move to fresh air, refer to medical attention. Swallow: refer to medical attention
1.3.1 – 1.3.22	Antimony	7440-36-0	None	0.5 mg/m^3 50 mg/m^3	Groundwater Soil	inhalation, ingestion, skin, and/or eye contact	irritation skin, dermatitis; resp distress; diarrhea; muscle tremor, convulsions; possible gastrointestinal tract	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Aroclor 1242	53469-21-9	None	0.5 mg/m^3 5 mg/m^3	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, chloracne	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Aroclor 1248	12672-26-6	None	0.5 mg/m^3 5 mg/m^3	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, chloracne	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Aroclor 1254	11097-69-1	None	0.5 mg/m^3 5 mg/m^3	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, chloracne	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Aroclor 1260	11096-82-5	None	0.5 mg/m^3 5 mg/m^3	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, chloracne	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Arsenic	NA	None	0.5 mg/m^3 NA	Groundwater Soil	inhalation, ingestion, skin, and/or eye contact	irritation skin, dermatitis; resp distress; diarrhea; muscle tremor, convulsions; possible gastrointestinal tract	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Barium	10022-31-8	None	0.5 mg/m^3 50 mg/m^3	Groundwater Soil	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, upper respiratory system; skin, burns; gastroenteritis; muscle spasm; slow pulse	Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Benzene Benzol Phenyl hydride Alkyl benzene isomers	71-43-2	PID	3.19 mg/m^3 1,595 mg/mg^3	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait; lassitude (weakness, exhaustion) [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Benzo(a)anthracene Benzanthracene Benzanthrene 1,2-Benzanthracene Benzo[b]phenanthrene Tetraphene	56-55-3	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Groundwater Soil	inhalation, skin, or eye contact, ingestion	dermatitis, bronchitis, [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Benzo(a)pyrene	50-32-8	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Soil	inhalation, skin, or eye contact, ingestion	dermatitis, bronchitis, [potential occupational carcinogen]	Eye: Irrigate immediately, seek medical attention Skin: Soap wash immediately. Breathing: move to fresh air. Swallow: Induce vomiting if conscious, seek medical attention immediately
1.3.1 – 1.3.22	Benzo(b)fluoranthene	205-99-2	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Soil	inhalation, skin, or eye contact, ingestion	irritation to eyes and skin, respiratory irritation (dizziness, weakness, fatigue, nausea, headache)	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.22	Benzo(g,h,i)perylene Benzo(ghi)perylene	191-24-2	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Soil	inhalation, skin, or eye contact, ingestion	irritation to eyes and skin, respiratory irritation (dizziness, weakness, fatigue, nausea, headache)	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Benzo(k)fluoranthene	207-08-9	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Soil	inhalation, skin, or eye contact, ingestion	irritation to eyes and skin, respiratory irritation (dizziness, weakness, fatigue, nausea, headache)	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.22	Benzyl butyl phthalate Butyl benzyl phthalate Butylbenzylphthalate	86-66-7	None	NA NA	Groundwater Soil Vapor	inhalation, skin, or eye contact, ingestion	irritation to eyes and skin, respiratory irritation (dizziness, weakness, fatigue, nausea, headache	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.22	Beryllium	7440-41-7	None	0.002 mg/m^3 4 mg/m^3	Soil	inhalation, skin, and/or eye contact	berylliosis (chronic exposure): anorexia, weight loss, lassitude (weakness, exhaustion), chest pain, cough, clubbing of fingers, cyanosis, pulmonary insufficiency; irritation to the eyes; dermatitis; [potential occupational carcinogen]	Eye: Irrigate immediately Breathing: Fresh air

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Beta-Endosulfan Beta Endosulfan Endosulfan II (beta) Endosulfan II	33213-65-9	None	None	NA NA	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation skin; nausea, confusion, agitation, flushing, dry mouth, tremor, convulsions, headache; in animals: kidney, liver injury; decreased testis weight
1.3.1 – 1.3.22	Bis(2-ethylhexyl)phthalate Bis(2-Ethylhexyl) Phthalate Di-sec octyl phthalate DEHP Di(2-ethylhexyl)phthalate Octyl phthalate bis(2-ethylexyl)phthalate	117-81-7	None	5 mg/m^3 5000 mg/m^3	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, mucous membrane; in animals: liver damage; teratogenic effects; [potential occupational carcinogen	Eye: Irrigate immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Bromodichloromethane Dichlorobromomethane Bromo(dichloro)methane	75-27-4	NA	NA NA	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, upper respiratory system, stomach	Eye: Irrigate immediately Skin: Wash regularly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Cadmium	7440-43-9	None	0.005 mg/m^3 9 mg/m^3	Soil	inhalation, ingestion	pulmonary edema, dyspnea (breathing difficulty), cough, chest tightness, substernal (occurring beneath the sternum) pain; headache; chills, muscle aches; nausea, vomiting, diarrhea; anosmia (loss of the sense of smell), emphysema, proteinuria, mild anemia; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Calcium	7440-70-2	None	NA	Groundwater Soil	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, upper resp tract; ulcer, perforation nasal septum; pneumonitis; dermatitis	Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Chlorobenzene benzene chloride monochlorobenzene Phenyl chloride Chlorobenzol MCB	108-90-7	PID	75 ppm 1000 ppm	Groundwater Soil Vapor	inhalation, skin, or eye contact, ingestion	irritation to the eyes, skin, nose; drowsiness, incoordination; central nervous system depression; in animals: liver, lung, kidney injury	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Chloroform Methane trichloride Trichloromethane Chloro-3-methyl phenol	67-66-3	None	50 ppm 500 ppm	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin; dizziness, mental dullness, nausea, confusion; headache, lassitude (weakness, exhaustion); anesthesia; enlarged liver; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Chromium Total Chromium Chromium, Total	7440-47-3	None	1.0 mg/m^3 250 mg/m^3	Groundwater Soil	inhalation absorption ingestion	irritation to eye, skin, and respiratory	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Chrysene Benzo[a]phenanthrene 1,2-Benzphenanthrene	218-01-9	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Groundwater Soil	inhalation, absorption, ingestion, consumption	irritation to eye, skin, and respiratory, gastrointestinal irritation nausea, vomit, diarrhea [potential occupational carcinogen]	Eyes: Irrigate immediately Skin: Soap wash promptly. Breath: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	cis-1,2-Dichloroethylene cis-1,2-Dichloroethene	156-59-2	NA	NA NA	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	Irritant to eyes, skin, mucous membranes, and respiratory system. May be harmful by ingestion, skin absorption and inhalation	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Cobalt	7440-48-4	None	0.1mg/m^3 20 mg/m^3	Soil	inhalation, ingestion, skin, and/or eye contact	Cough, dyspnea (breathing difficulty), wheezing, decreased pulmonary function; weight loss; dermatitis; diffuse nodular fibrosis; resp hypersensitivity, asthma	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Copper	7440-50-8	None	1.0 mg/m^3 100 mg/m^3	Groundwater Soil	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, nose, metallic taste; dermatitis; anemia	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Cumene Cumol Isopropylbenzene 2-Phenyl propane 1-methylethy lbenzene Isopropyl Benzene	98-82-8	PID	50 ppm 900 ppm	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, mucous membrane; dermatitis; headache, narcosis, coma	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Cyanide	57-12-5	None	5 mg/m^3 25 mg/m^3	Groundwater Soil	inhalation, ingestion, skin, and/or eye contact	Exposure to cyanide can cause weakness, headaches, confusion, dizziness, fatigue, anxiety, sleepiness, nausea and vomiting. Breathing can speed up then become slow and gasping. Coma, and convulsions also occur. If copious amounts of cyanide have been absorbed by the body, the person usually collapses, and death can occur very quickly. Long-term exposure to lower levels of cyanide can cause skin, and nose irritation, itching, rashes and thyroid changes.	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Cyclohexane Benzene hexahydride Hexahydrobenzene Hexamethylene Hexanaphthene	110-82-7	PID	300 ppm 1300 ppm	Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, respiratory system; drowsiness; dermatitis; narcosis, coma	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	DDE 4,4-DDE 4,4′-DDE 1,1-bis-(4-chlorophenyl)-2,2-dichloroethene Dichlorodiphenyldichloroethylene p,p'-DDE	72-55-9	None	NA NA	Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	Oral ingestion of food is the primary source of exposure for the general population. Acute and chronic ingestion may cause nausea, vomiting, diarrhea, stomach pain, headache, dizziness, disorientation, tingling, sensation, kidney damage, liver damage, convulsions, coma, and death. 4,4' DDE may cross the placenta and can be excreted in breast milk	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	DDT 4,4-DDT 4,4′-DDT p,p′-DDT Dichlorodiphenyltrichloroethane 1,1,1-Trichloro-2,2-bis(p-chlorophenyl)ethane	50-29-3	None	1 mg/m^3 500 mg/m^3	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin; paresthesia tongue, lips, face; tremor; anxiety, dizziness, confusion, malaise (vague feeling of discomfort), headache, lassitude (weakness, exhaustion); convulsions; paresis hands; vomiting; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Dibenz(a,h)anthracene Dibenzo(a,h)anthracene Dibenzo[a,h]anthracene	53-70-3	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Groundwater Soil	inhalation, absorption, ingestion, consumption	irritation to eyes, skin, respiratory, and digestion [potential occupational carcinogen]	Eyes: Irrigate immediately Skin: Soap wash promptly. Breath: Respiratory support PID Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Dibenzofuran	132-64-9	None	NA NA	Soil	inhalation, absorption	irritation to eyes, and skin	Eyes: Irrigate immediately Skin: Soap wash promptly.
1.3.1 – 1.3.22	Dibutyl phthalate Di-n-butyl phthalate Butyl phthalate n-Butyl phthalate 1,2-Benzenedicarboxylic acid dibutyl ester o-Benzenedicarboxylic acid dibutyl ester DBP Palatinol C, Elaol Dibutyl-1,2-benzene-dicarboxylate Di-n-butylphthalate	84-74-2	None	5 mg/m^3 4000 mg/m^3	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, upper respiratory system, stomach	Eye: Irrigate immediately Skin: Wash regularly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Dichlorodifluoromethane Difluorodichloromethane, Fluorocarbon 12 Freon 12 Freon® 12 Genetron® 12 Halon® 122 Propellant 12 Refrigerant 12 Dichlorodifluromethane	75-71-8	None	1000 pp, 15,000 ppm	Groundwater Soil Vapor	inhalation, skin, and/or eye contact (liquid)	dizziness, tremor, asphyxia, unconsciousness, cardiac arrhythmias, cardiac arrest; liquid: frostbite	Eye: Frostbite Skin: Frostbite Breathing: Respiratory support
1.3.1 – 1.3.22	Dieldrin HEOD 1,2,3,4,10,10-Hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4-endo exo-5,8-dimethanonaphthalene	60-57-1	PID	0.25 mg/m^3 50 mg/m^3	Groundwater Soil Water	inhalation, skin absorption, ingestion, skin, and/or eye contact	headache, dizziness; nausea, vomiting, malaise (vague feeling of discomfort), sweating; myoclonic limb jerks; colonic, tonic convulsions; coma; [potential occupational carcinogen]; in animals: liver, kidney damage	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Diesel Fuel automotive diesel fuel oil No. 2 distillate diesoline diesel oil diesel oil light diesel oil No. 1-D summer diesel	68334-30-5	PID	NA NA	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat; burning sensation in chest; headache, nausea, lassitude (weakness, exhaustion), restlessness, incoordination, confusion, drowsiness; vomiting, diarrhea; dermatitis; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Dimethyl phthalate Dimethylphthalate dimethyl benzene-1,2-dicarboxylate	131-11-3	None	5 mg/m3 2000 mg/m3	Groundwater Soil	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, upper respiratory system; stomach pain	Eye: Irrigate promptly Skin: Wash regularly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Di-n-octyl phthalate Di-n-cotylphthalate Di-n-octylphthalate Di-sec octyl phthalate Dioctyl phthalate DEHP, Di(2-ethylhexyl)phthalate, DOP, bis-(2-Ethylhexyl)phthalate, Octyl phthalate	117-84-0	None	5 mg/m^3 5000 mg/m^3	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, mucous membrane; in animals: liver damage; teratogenic effects; [potential occupational carcinogen]	Eye: Irrigate immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Endrin 1,2,3,4,10,10-Hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4-endo,endo-5,8-dimethanonaphthalene; Hexadrin	72-20-8	None	0.1 mg/m^3 2 mg/m^3	Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	epileptiform convulsions; stupor, headache, dizziness; abdominal discomfort, nausea, vomiting; insomnia; aggressiveness, confusion; drowsiness, lassitude (weakness, exhaustion); anorexia; in animals: liver damage	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Ethyl acetate Acetic ester Acetic ether Ethyl ester of acetic acid Ethyl ethanoate	141-78-6	PID	400 ppm 2000 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation eyes, skin, nose, throat; narcosis; dermatitis	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Ethyl benzene Ethylbenzene Ethylbenzol Phenylethane	100-41-4	PID	435 mg/m^3 3,472 mg/m^3	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, mucous membrane; headache; dermatitis; narcosis, coma	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Fluoranthene Benzo(j,k)fluorene	206-44-0	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Groundwater Soil	inhalation, skin, or eye contact, ingestion	irritation to eyes and skin, respiratory irritation (dizziness, weakness, fatigue, nausea, headache)	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.22	Fluorene	86-73-7	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Soil	inhalation, skin, or eye contact, ingestion	irritation to eyes and skin, respiratory irritation (dizziness, weakness, fatigue, nausea, headache)	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention
1.3.1 – 1.3.22	Fuel Oil No. 2	68476-30-2	PID	NA NA	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat; burning sensation in chest; headache, nausea, lassitude (weakness, exhaustion), restlessness, incoordination, confusion, drowsiness; vomiting, diarrhea; dermatitis; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	gamma-Chlordane Gamma Chlordane y-Chlordane	5566-34-7	None	0.5 mg/m^3 100 mg/m^3	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	Blurred vision; confusion; ataxia, delirium; cough; abdominal pain, nausea, vomiting, diarrhea; irritability, tremor, convulsions; anuria	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Gasoline	8006-61-9	PID	NA NA	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, mucous membrane; dermatitis; headache, lassitude (weakness, exhaustion), blurred vision, dizziness, slurred speech, confusion, convulsions; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Helium	7440-59-7	Helium Detector	NA NA	NA	inhalation	dizziness, headache, and nausea	Breathing: Respiratory support
1.3.1 – 1.3.22	Heptachlor	76-44-8	None	0.5 mg/m^3 35 mg/m^3	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	In animals: tremor, convulsions; liver damage; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Heptachlor epoxide 1,4,5,6,7,8,8-Heptachloro-3a,4,7,7a-tetrahydro-4,7-methano-1H-indene	1024-57-3	None	0.5 mg/m^3 35 mg/m^3	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	In animals: tremor, convulsions; liver damage; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Heptane n-Heptane	142-82-5	PID	500 ppm 750 ppm	Goundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	dizziness, stupor, incoordination; loss of appetite, nausea; dermatitis; chemical pneumonitis (aspiration liquid); unconsciousness	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Indeno(1,2,3-cd)pyrene Indeno(1,2,3-c,d)Pyrene Indeno[1,2,3-cd]Pyrene	193-39-5	None	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Groundwater Soil	inhalation, absorption, ingestion, consumption	irritation to eyes, skin, respiratory, and digestion [potential occupational carcinogen]	Eyes: Irrigate immediately Skin: Soap wash promptly. Breath: Respiratory support Swallow: Medical attention immediately, wash mouth with water
1.3.1 – 1.3.22	Iron	7439-89-6	None	10 mg/m^3 NA	Groundwater Soil	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, mucous membrane; abdominal pain, diarrhea, vomiting	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Isopropyl alcohol Iso-Propyl Alcohol Carbinol IPA Isopropanol 2-Propanol sec-Propyl alcohol Rubbing alcohol Isopropylalcohol	67-63-0	PID	400 ppm 2000 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, nose, throat; drowsiness, dizziness, headache; dry cracking skin; in animals: narcosis	Eye: Irrigate immediately Skin: Water flush Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Lead	7439-92-1	None	0.050 mg/m^3 100 mg/m^3	Groundwater Soil	inhalation, ingestion, skin, and/or eye contact	lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation to the eyes; hypertension	Eye: Irrigate immediately Skin: Soap flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Lindane Gamma BHC HCH ã-Hexachlorocyclohexane gamma isomer of 1,2,3,4,5,6-Hexachlorocyclohexane gamma-Hexachlorocyclohexane	58-89-9	None	0.5 mg/m^3 50 mg/m^3	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat; headache; nausea; colonic convulsions; resp difficulty; cyanosis; aplastic anemia; muscle spasm; in animals: liver, kidney damage	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Magnesium	7439-95-4	None	15 mg/m^3 NA	Soil	inhalation, skin, and/or eye contact	irritation to the eyes, skin, respiratory system; cough	Eye: Irrigate immediately Breathing: Fresh air

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Manganese	7439-96-5	None	5 mg/m^3 500 mg/m^3	Groundwater Soil	inhalation, ingestion	aerosol is irritating to the respiratory tract	Eye: Irrigate immediately Skin: Soap flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	m-Cresol meta-Cresol 3-Cresol m-Cresylic acid 1-Hydroxy-3-methylbenzene 3-Hydroxytoluene 3-Methylphenol 3-Methylphenols	108-39-4	PID	5 ppm 250 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, mucous membrane; central nervous system effects: confusion, depression, resp failure; dyspnea (breathing difficulty), irregular rapid respiration, weak pulse; eye, skin, burns; dermatitis; lung, liver, kidney, pancreas damage	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Mercury	7439-97-6	None	0.1 mg/m^3 10 mg/m^3	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Methane Tetrahydridocarbon Carbane Marsh Gas Natural Gas Carbon tetrahydride Hydrogen carbide	74-82-8	PID	NA NA	Groundwater Soil Vapor	inhalation, skin, and/or eye contact (liquid)	dizziness, confusion, excitation, asphyxia; liquid: frostbite	Eye: Frostbite Skin: Frostbite Breathing: Respiratory support
1.3.1 – 1.3.22	Methoxychlor 4,4′-Methoxychlor p,p'-Dimethoxydiphenyltrichloroethane DMDT Methoxy-DDT 2,2-bis(p-Methoxyphenyl)-1,1,1-trichloroethane 1,1,1-Trichloro-2,2-bis-(p-methoxyphenyl)ethane	72-43-5	None	15 mg/m^3 5000 mg/m^3	Groundwater Soil Vapor	inhalation, ingestion	fasciculation, trembling, convulsions; kidney, liver damage; [potential occupational carcinogen]	Skin: Soap wash Breathing: Fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.22	Methyl Acetate	79-20-9	PID	200 ppm 3100 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat; headache, drowsiness; optic nerve atrophy; chest tightness; in animals: narcosis	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Methyl *tert*-butyl ether MTBE Methyl tertiary-butyl ether Methyl t-butyl ether tert-Butyl methyl ether tBME tert-BuOMe Methyl tert butyl ether	1634-04-4	PID	NA NA	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat; burning sensation in chest; headache, nausea, lassitude (weakness, exhaustion), restlessness, incoordination, confusion, drowsiness; vomiting, diarrhea; dermatitis; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Methylcyclohexane Methyl cyclohexane Methylcyclohexane Hexahydrotoluene Cyclohexylmethane Toluene hexahydride	108-87-2	PID	500 ppm 1200 ppm	Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat; dizziness, drowsiness; in animals: narcosis	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Methylene Chloride Dichloromethane Methylene dichloride	75-09-2	PID	25 ppm 2300 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin; lassitude (weakness, exhaustion), drowsiness, dizziness; numb, tingle limbs; nausea; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	m-Xylenes 1,3-Dimethylbenzene m-Xylol Metaxylene	108-38-3 179601-23-1	PID	100 ppm 900 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; nausea, vomiting, abdominal pain; dermatitis	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Naphthalene Naphthalin Tar camphor White tar	91-20-3	PID	50 mg/m^3 250 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes; headache, confusion, excitement, malaise (vague feeling of discomfort); nausea, vomiting, abdominal pain; irritation bladder; profuse sweating; hematuria (blood in the urine); dermatitis, optical neuritis	Eye: Irrigate immediately Skin: Molten flush immediately/solid-liquid soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	n-Butylbenzene Butylbenzene 1-phenylbutane	104-51-8	PID	NA NA	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin; dry nose, throat; headache; low blood pressure, tachycardia, abnormal cardiovascular system stress; central nervous system, hematopoietic depression; metallic taste; liver, kidney injury	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	N-ethyl perfluorooctane sulfonamido acetic acid NEtFOSAA N-ethyl perfluorooctane sulfonamido acetic acid (N-EtFOSAA) N-Ethylperfluorooctanesulfonamide N-Ethyl Perfluorooctanesulfonamidoacetic Acid N-ethyl perfluorooctane-sulfonamidoacetic acid N-Ethyl-N-[(heptadecafluorooctyl)sulphonyl]glycine	2991-50-6	NA	None None	Groundwater Soil	inhalation, skin, or eye contact, ingestion	irritation to eyes with eye damage, skin, causing rash, redness or burning, irritation to nose, throat, and lungs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	n-Hexane Hexane, Hexyl hydride, normal-Hexane	110-54-3	PID	500 ppm 1100 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, nose; nausea, headache; peripheral neuropathy: numb extremities, muscle weak; dermatitis; dizziness; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Nickel	7440-02-0	None	NA 10 mg/m^3	Groundwater Soil	ion, ingestion, skin, and/or eye contact	sensitization dermatitis, allergic asthma, pneumonitis; [potential occupational carcinogen]	Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Non-Flammable Gas Mixture CALGAS (Equipment Calibration Gas : Oxygen Methane Hydrogen Sulfide Carbon Monoxide Nitrogen	 7782-44-7 74-82-8 7783-08-4 830-08-0 7727-37-9	Multi-Gas PID	 NA/NA NA/NA 10/100 ppm 50/1200 ppm NA/NA	NA	inhalation	dizziness, headache, and nausea	Breathing: Respiratory support
1.3.1 – 1.3.22	Non-Flammable Gas Mixture CALGAS (Equipment Calibration Gas : Oxygen Isobutylene Nitrogen	 7782-44-7 115-11-7 7727-37-9	PID	 NA/NA NA/NA NA/NA	NA	inhalation	dizziness, headache, and nausea	Breathing: Respiratory support
1.3.1 – 1.3.22	n-Propylbenzene Isocumene Propylbenzene 1-Phenylpropane 1-Propylbenzene Phenylpropane Propylbenzene-n	103-65-1	PID	NA NA	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin; dry nose, throat; headache; low blood pressure, tachycardia, abnormal cardiovascular system stress; central nervous system, hematopoietic depression; metallic taste; liver, kidney injury	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	o-Xylenes 1,2-Dimethylbenzene ortho-Xylene o-Xylol	95-47-6 179601-23-1	PID	100 ppm 900 ppm	Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; nausea, vomiting, abdominal pain; dermatitis	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	p-Cresol para-Cresol 4-Cresol p-Cresylic acid 1-Hydroxy-4-methylbenzene 4-Hydroxytoluene 4-Methylphenol 4-Methylphenols	106-44-5	PID	5 ppm 250 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, mucous membrane; central nervous system effects: confusion, depression, resp failure; dyspnea (breathing difficulty), irregular rapid respiration, weak pulse; eye, skin, burns; dermatitis; lung, liver, kidney, pancreas damage	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Perfluorobutanoic Acid Heptafluorobutyric acid Heptafluorobutanoic acid Perfluorobutyric acid PFBA	375-22-4	NA	None None	Groundwater	inhalation, skin, or eye contact, ingestion	irritation to eyes with eye damage, skin, causing rash, redness or burning, irritation to nose, throat, and lungs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Perfluorodecanesulfonic Acid PFDS	335-77-3	NA	NA NA	Groundwater	inhalation, skin, or eye contact, ingestion	irritation to eyes with eye damage, skin, causing rash, redness or burning, irritation to nose, throat, and lungs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Perfluorodecanoic acid PFDA	335-76-2	NA	None None	Groundwater	inhalation, skin, or eye contact, ingestion	irritation to eyes with eye damage, skin, causing rash, redness or burning, irritation to nose, throat, and lungs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Perfluoroheptane sulfonic Acid Perfluoroheptane sulfonate Perfluoroheptanesulfonic acid PFHpS	375-92-8	NA	None None	Groundwater Soil	inhalation, skin, or eye contact, ingestion	irritation to eyes with eye damage, skin, causing rash, redness or burning, irritation to nose, throat, and lungs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Perfluoroheptanoic acid Perfluoroheptanoic acid Tridecafluoroheptanoic acid PFHpA	375-85-9	NA	None None	Groundwater	inhalation, skin, or eye contact, ingestion	irritation to eyes with eye damage, skin, causing rash, redness or burning, irritation to nose, throat, and lungs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Perfluorohexanesulfonic Acid perfluorohexanesulfonate perfluorohexanesulfonic acid Perfluorohexane-1-sulphonic acid PFHxS	355-46-4	NA	None None	Groundwater	inhalation, skin, or eye contact, ingestion	irritation to eyes with eye damage, skin, causing rash, redness or burning, irritation to nose, throat, and lungs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Perfluorohexanoic Acid PFHxA	307-24-4	NA	None None	Groundwater	inhalation, skin, or eye contact, ingestion	irritation to eyes with eye damage, skin, causing rash, redness or burning, irritation to nose, throat, and lungs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Perfluorooctanesulfonic Acid PFOS	1763-23-1	NA	None None	Groundwater	inhalation, skin, or eye contact, ingestion	irritation to eyes with eye damage, skin, causing rash, redness or burning, irritation to nose, throat, and lungs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Perfluorooctanoic Acid PFOA pentadecafluorooctanoic acid perfluorooctanoate perfluorocaprylic acid	335-67-1	NA	None None	Groundwater	inhalation, skin, or eye contact, ingestion	irritation to eyes with eye damage, skin, causing rash, redness or burning, irritation to nose, throat, and lungs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	p-Ethyltoluene 4-Ethyltoluene 1-ethyl-4-methyl-benzene 1-methyl-4-ethylbenzene	622-96-8	NA	NA NA	Soil	ingestion, skin, and/or eye contact	irritation to the eyes, skin, mucous membrane; headache; dermatitis; narcosis, coma	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Phenanthrene	85-01-8	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Groundwater Soil	inhalation, skin, or eye contact, ingestion	irritation to eyes and skin, respiratory irritation (dizziness, weakness, fatigue, nausea, headache)	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.22	Phenol Carbolic acid Hydroxybenzene, Monohydroxybenzene Phenyl alcohol Phenyl hydroxide	108-95-2	PID	5 ppm 250 ppm	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, nose, throat; anorexia, weight loss; lassitude (weakness, exhaustion), muscle ache, pain; dark urine, skin, burns; dermatitis; tremor, convulsions, twitching	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Potassium	7440-09-7	None	NA NA	Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact inhalation, ingestion, skin, and/or eye contact	eye: Causes eye burns. Skin: Causes skin, burns. Reacts with moisture in the skin, to form potassium hydroxide and hydrogen with heat. ingestion: Causes gastrointestinal tract burns. inhalation: May cause irritation of the respiratory tract with burning pain in the nose and throat, coughing, wheezing, shortness of breath and pulmonary edema. Causes chemical burns to the respiratory tract. inhalation may be fatal because of spasm, inflammation, edema of the larynx and bronchi, chemical pneumonitis, and pulmonary edema.	Eyes: Get medical aid immediately Skin: Get medical aid immediately. Immediately flush skin with water for at least 15 minutes while removing contaminated clothing and shoes. Ingestion: If victim is conscious and alert, give 2-4 full cups of milk or water. Get medical aid immediately. inhalation: Get medical aid immediately.
1.3.1 – 1.3.22	Propylene Propene Methyl ethylene	115-07-1	PID	NA NA	Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, nose, throat, skin, burns. asphyxiation	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	p-Xylenes 1,4-Dimethylbenzene para-Xylene p-Xylol	106-42-3	PID	100 ppm 900 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; nausea, vomiting, abdominal pain; dermatitis	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Pyrene benzo[def]phenanthrene	129-00-0	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Groundwater Soil	inhalation, skin, or eye contact, ingestion	irritation to eyes and skin, respiratory irritation (dizziness, weakness, fatigue, nausea, headache)	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.22	sec-Butylbenzene 2-phenylbutane	135-98-8	PID	10 ppm 100 ppm	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, nose, throat. inhalation: nausea or vomiting	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Selenium	7782-49-2	None	1 mg/m^3 0.2 mg/m^3	Soil	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat; visual disturbance; headache; chills, fever; dyspnea (breathing difficulty), bronchitis; metallic taste, garlic breath, gastrointestinal disturbance; dermatitis; eye, skin, burns; in animals: anemia; liver necrosis, cirrhosis; kidney, spleen damage	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Silver	7440-22-4	None	0.01mg/ m^3 10 mg/m^3	Soil	inhalation, ingestion, skin, and/or eye contact	blue-gray eyes, nasal septum, throat, skin; irritation, ulceration skin; gastrointestinal disturbance	Eye: Irrigate immediately Skin: Water flush Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Sodium	7440-23-5	None	NA NA	Groundwater Soil	ion, ingestion, skin, and/or eye contact	sensitization dermatitis, allergic asthma, pneumonitis; [potential occupational carcinogen]	Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate; 8:2 FTS Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2) (8:2FTS)	27619-96-1	NA	None None	Groundwater	inhalation, skin, or eye contact, ingestion	irritation to eyes with eye damage, skin, causing rash, redness or burning, irritation to nose, throat, and lungs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Styrene Ethenyl benzene Phenylethylene Styrene monomer Styrol Vinyl benzene	100-42-5	PID	100 ppm 700 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, nose, respiratory system; headache, lassitude (weakness, exhaustion), dizziness, confusion, malaise (vague feeling of discomfort), drowsiness, unsteady gait; narcosis; defatting dermatitis; liver injury; reproductive effects	Eye: Irrigate immediately Skin: Water flush Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Tert-Butyl Alcohol Tertiary Butyl Alcohol Tert-Butanol Butyl alcohol 2-Methyl-2-propanol Trimethyl carbinol Tert-Butyl Alcohol TBA	75-65-0	PID	100 ppm 1600 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat; drowsiness, narcosis	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	tert-Butylbenzene *t*-Butylbenzene 2-Methyl-2-phenylpropane Pseudobutylbenzene	98-06-6	PID	10 ppm NA	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	eye, skin, irritation; dry nose, throat; headaches; low blood pressure, tachycardia; abnormal cardiovascular system; central nervous system depression; hematopoietic depression	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Tetrachloroethane 1,1,2,2-Tetrachloroethane Acetylene tetrachloride Symmetrical tetrachloroethane	79-34-5	PID	5 ppm 100 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	nausea, vomiting, abdominal pain; tremor fingers; jaundice, hepatitis, liver tenderness; dermatitis; leukocytosis (increased blood leukocytes); kidney damage; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Tetrachloroethylene Perchlorethylene Perchloroethylene PCE Perk Tetrachlorethylene Tetrachloroethene	127-18-4	PID	100 ppm 150 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, incoordination; headache, drowsiness; skin, erythema (skin, redness); liver damage; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Thallium	7440-28-0	None	0.1 mg/m^3 15 mg/m^3	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	nausea, diarrhea, abdominal pain, vomiting; ptosis, strabismus; peri neuritis, tremor; retrosternal (occurring behind the sternum) tightness, chest pain, pulmonary edema; convulsions, chorea, psychosis; liver, kidney damage; alopecia; paresthesia legs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Toluene Methyl benzene Methyl benzol Phenyl methane Toluol	108-88-3	PID	200 ppm 500 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, nose; lassitude (weakness, exhaustion), confusion, euphoria, dizziness, headache; dilated pupils, lacrimation (discharge of tears); anxiety, muscle fatigue, paresthesia; dermatitis	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Total PCBs Chlorodiphenyl (42% chlorine) Aroclor® 1242 PCB Polychlorinated biphenyl	53469-21-9	None	0.5 mg/m^3 5 mg/m^3	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, chloracne	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Total Xylenes Dimethylbenzene Xylol	1330-20-7	PID	100 ppm 900 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; nausea, vomiting, abdominal pain; dermatitis	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Trichloroethylene Trichloroetheneylenes Ethylene trichloride TCE Trichloroethene Trilene	79-01-6	PID	100 ppm 1000 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin; headache, visual disturbance, lassitude (weakness, exhaustion), dizziness, tremor, drowsiness, nausea, vomiting; dermatitis; cardiac arrhythmias, paresthesia; liver injury; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Trichlorofluoromethane Fluorotrichloromethane Freon® 11 Monofluorotrichloromethane Refrigerant 11 Trichloromonofluoromethane Freon 11	75-69-4	PID	1000 ppm 2000 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	incoordination, tremor; dermatitis; cardiac arrhythmias, cardiac arrest; asphyxia; liquid: frostbite	Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Trivalent Chromium Chromium III Chromium, Trivalent	NA	None	1.0 mg/m^3 250 mg/m^3	Groundwater Soil	inhalation absorption ingestion	irritation to eye, skin, and respiratory	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.22	Vanadium	7440-62-2	None	0.1 mg/m3 15 mg/m3	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	nausea, diarrhea, abdominal pain, vomiting; ptosis, strabismus; peri neuritis, tremor; retrosternal (occurring behind the sternum) tightness, chest pain, pulmonary edema; convulsions, chorea, psychosis; liver, kidney damage; alopecia; paresthesia legs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.22	Vinyl Chloride Chloroethene Chloroethylen Ethylene monochloride Monochloroethene Monochloroethylene VC Vinyl chloride monomer (VCM)	75-01-4	PID	1 ppm NA	Groundwater Soil Vapor	inhalation, skin, and/or eye contact (liquid)	lassitude (weakness, exhaustion); abdominal pain, gastrointestinal bleeding; enlarged liver; pallor or cyanosis of extremities; liquid: frostbite; [potential occupational carcinogen]	Eye: Frostbite Skin: Frostbite Breathing: Respiratory support
1.3.1 – 1.3.22	Zinc	7440-62-2	None	15 mg/m^3 500 mg/m^3	Groundwater Soil	inhalation	chills, muscle ache, nausea, fever, dry throat, cough; lassitude (weakness, exhaustion); metallic taste; headache; blurred vision; low back pain; vomiting; malaise (vague feeling of discomfort); chest tightness; dyspnea (breathing difficulty), rales, decreased pulmonary function	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately

EXPLANATION OF ABBREVIATIONS

PID = Photoionization Detector

PEL = Permissible Exposure Limit (8-hour Time Weighted Average)

IDLH = Immediately Dangerous to Life and Health

ppm = part per million
mg/m^3 = milligrams per cubic meter
500 mg/m^3

TABLE 3
SUMMARY OF MONITORING EQUIPMENT

Instrument	Operation Parameters
Photoionization Detector (PID)	**Hazard Monitored:** Many organic and some inorganic gases and vapors. **Application:** Detects total concentration of many organic and some inorganic gases and vapors. Some identification of compounds is possible if more than one probe is measured. **Detection Method:** Ionizes molecules using UV radiation; produces a current that is proportional to the number of ions. **General Care/Maintenance:** Recharge or replace battery. Regularly clean lamp window. Regularly clean and maintain the instrument and accessories. **Typical Operating Time:** 10 hours. 5 hours with strip chart recorder.
Oxygen Meter	**Hazard Monitored:** Oxygen (O_2). **Application:** Measures the percentage of O_2 in the air. **Detection Method:** Uses an electrochemical sensor to measure the partial pressure of O_2 in the air, and converts the reading to O_2 concentration. **General Care/Maintenance:** Replace detector cell according to manufacturer's recommendations. Recharge or replace batteries prior to explanation of the specified interval. If the ambient air is less than 0.5% C O_2, replace the detector cell frequently. **Typical Operating Time:** 8 – 12 hours.
Additional equipment (if needed, based on site conditions)	
Combustible Gas Indicator (CGI)	**Hazard Monitored:** Combustible gases and vapors. **Application:** Measures the concentration of combustible gas or vapor. **Detection Method:** A filament, usually made of platinum, is heated by burning the combustible gas or vapor. The increase in heat is measured. Gases and vapors are ionized in a flame. A current is produced in proportion to the number of carbon atoms present. **General Care/Maintenance:** Recharge or replace battery. Calibrate immediately before use. **Typical Operating Time:** Can be used for as long as the battery lasts, or for the recommended interval between calibrations, whichever is less.
Flame Ionization Detector (FID) with Gas Chromatography Option *(i.e., Foxboro Organic Vapor Analyzer (OVA))*	**Hazard Monitored:** Many organic gases and vapors (approved areas only). **Application:** In survey mode, detects the concentration of many organic gases and vapors. In gas chromatography (GC) mode, identifies and measures specific compounds. In survey mode, all the organic compounds are ionized and detected at the same time. In GC mode, volatile species are separated. **General Care/Maintenance:** Recharge or replace battery. Monitor fuel and/or combustion air supply gauges. Perform routine maintenance as described in the manual. Check for leaks. **Typical Operating Time:** 8 hours; 3 hours with strip chart recorder.
Potable Infrared (IR) Spectrophotometer	**Hazard Monitored:** Many gases and vapors. **Application:** Measures concentration of many gases and vapors in air. Designed to quantify one or two component mixtures. **Detection Method:** Passes different frequencies of IR through the sample. The frequencies absorbed are specific for each compound. **General Care/Maintenance:** As specified by the manufacturer.

Instrument	Operation Parameters
Direct Reading Colorimetric Indicator Tube	**Hazard Monitored:** Specific gas and vapors. **Application:** Measures concentration of specific gases and vapors. **Detection Method:** The compound reacts with the indicator chemical in the tube, producing a stain whose length or color change is proportional to the compound's concentration. **General Care/Maintenance:** Do not use a previously opened tube even if the indicator chemical is not stained. Check pump for leaks before and after use. Refrigerate before use to maintain a shelf life of about 2 years. Check expiration dates of tubes. Calibrate pump volume at least quarterly. Avoid rough handling which may cause channeling.
Aerosol Monitor	**Hazard Monitored:** Airborne particulate (dust, mist, fume) concentrations. **Application:** Measures total concentration of semi-volatile organic compounds, PCBs, and metals. **Detection Method:** Based on light-scattering properties of particulate matter. Using an internal pump, air sample is drawn into the sensing volume where near infrared light scattering is used to detect particles. **General Care/Maintenance:** As specified by the mfr. Also, the instrument must be calibrated with particulates of a size and refractive index similar to those to be measured in the ambient air.
Monitox	**Hazard Monitored:** Gases and vapors. **Application:** Measures specific gases and vapors. **Detection Method:** Electrochemical sensor specific for the chemical species in question. **General Care/Maintenance:** Moisten sponge before use; check the function switch; change the battery when needed.
Gamma Radiation Survey Instrument	**Hazard Monitored:** Gamma Radiation. **Application:** Environmental radiation monitor. **Detection Method:** Scintillation detector. **General Care/Maintenance:** Must be calibrated annually at a specialized facility. **Typical Operating Time:** Can be used for as long as the battery lasts, or for the recommended interval between calibrations, whichever is less.

TABLE 4
INSTRUMENTATION ACTION LEVELS

Photoionization Detector Action Levels	**Action Required**
Background to 5 parts per million (ppm)[1]	No respirator needed; no further action
>5ppm but </= 15 ppm at the perimeter of the work area	• Work temporarily halted and monitoring continues. • If instantaneous readings decrease below 5 ppm above background, work activities will resume with continued monitoring
>5ppm but </= 25 ppm at the downwind perimeter of the hot zone	• Work activities will be halted. • Source of vapors identified. • Corrective actions taken to abate emissions. • Continued monitoring. • Workers will don appropriate respirators and work can resume if vapor levels 200 feet downwind or the hot zone or half the distance to the nearest potential receptor or residential or commercial structure, whichever is less – but in no case less than 20 feet – is below 5 ppm above background for the 15-minute average
>25ppm at the parameter of the hot zone	Activities will shut down

Particulate Monitoring Action Levels	**Action Required**
Background to 100 micrograms per cubic meter (µg/m³)[2], no dust observed	No further action
Background to 100 µg/m³, dust observed leaving the work area	Dust suppression must be employed.
100 to 150 µg/m³ at the downwind parameter of the hot zone	• Work activities will be halted. • Source of dust identified. • Dust suppression activities initiated. • Corrective actions taken to abate emissions. • Continued monitoring. • Workers will don appropriate respirators. • Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM10 concentration to within 150 µg/m³ of the upwind level and in preventing visible dust migration.
>150 µg/m³ at the parameter of the hot zone	Activities will shut down

[1] VOC concentrations are 15-minute averages above site background (upwind parameter)
[2] Particulate concentrations are 15-minute averages above site background (upwind parameter)

TABLE 5
EMERGENCY NOTIFICATION LIST

ORGANIZATION	CONTACT	TELEPHONE
Local Police Department		911
Local Fire Department		911
Ambulance/Rescue Squad		911
Hospital	New York Hospital Queens	911 or 718-670-1231
Langan Incident Hotline		800-952-6426 extension 4699
Medical Treatment Hotline	WorkCare™	911 or 888-449-7757
Langan Environmental PM Langan Geotechnical PM Langan Site Civil Project PM	Nicholas Palumbc Vijayakrishnan Veluchamy Matthew Read	917-479-5435 (cell) 716-479-5480 (cell) 212-479-5522 (office)
Langan Health and Safety Manager (HSM)	Tony Moffa	215-756-2523 (cell)
Langan Health & Safety Officer (HSO)	William Bohrer	410-984-3068 (cell)
Langan Field Team Leader (FTL)	To Be Determined	
Client's Representative	Jim Strobel	203-485-9583
National Response Center (NRC)		800-424-8802
Chemical Transportation Emergency Center (Chemtrec)		800-424-9300
Center for Disease Control (CDC)		404-639-3534
EPA (RCRA Superfund Hotline)		800-424-9346
TSCA Hotline		202-554-1404
Poison Control Center		800-222-1222

Immediately following an injury, unless immediate emergency medical treatment is required, the injured employee must contact WorkCare - Incident Intervention® at 888-449-7787.

For all other incidents or near misses, unless emergency response is required, either the employee or a coworker must contact the Langan Incident Hotline at 973-560-4699.

TABLE 6
SUGGESTED FREQUENCY OF PHYSIOLOGICAL MONITORINGFOR FIT AND ACCLIMATED WORKERS[A]

Adjusted Temperature[b]	Normal Work Ensemble[c]	Impermeable Ensemble
90°F or above (32.2°C) or above	After each 45 min. of work	After each 15 min. of work
87.5°F (30.8°-32.2°C)	After each 60 min. of work	After each 30 min. of work
82.5°-87.5°F (28.1°-30.8°C)	After each 90 min. of work	After each 60 min. of work
77.5°-82.5°F (25.3°-28.1°C)	After each 120 min. of work	After each 90 min. of work
72.5°-77.5°F (22.5°-25.3°C)	After each 150 min. of work	After each 120 min. of work

a For work levels of 250 kilocalories/hour.

b Calculate the adjusted air temperature (ta adj) by using this equation: ta adj ^{o}F = ta ^{o}F + (13 x % sunshine). Measure air temperature (ta) with a standard mercury-in-glass thermometer, with the bulb shielded from radiant heat. Estimate percent sunshine by judging what percent time the sun is not covered by clouds that are thick enough to produce a shadow. (100 percent sunshine = no cloud cover and a sharp, distinct shadow; 0 percent sunshine = no shadows.)

c A normal work ensemble consists of cotton coveralls or other cotton clothing with long sleeves and pants.

TABLE 7

HEAT INDEX

ENVIRONMENTAL TEMPERATURE (Fahrenheit)

RELATIVE HUMIDITY	70	75	80	85	90	95	100	105	110	115	120
	APPARENT TEMPERATURE*										
0%	64	69	73	78	83	87	91	95	99	103	107
10%	65	70	75	80	85	90	95	100	105	111	116
20%	66	72	77	82	87	93	99	105	112	120	**130**
30%	67	73	78	84	90	96	104	113	123	**135**	**148**
40%	68	74	79	86	93	101	110	123	**137**	**151**	
50%	69	75	81	88	96	107	120	**135**	**150**		
60%	70	76	82	90	100	114	**132**	**149**			
70%	70	77	85	93	106	124	**144**				
80%	71	78	86	97	113	**136**					
90%	71	79	88	102	122						
100%	72	80	91	108							

*Combined Index of Heat and Humidity...what it "feels like" to the body
Source: National Oceanic and Atmospheric Administration

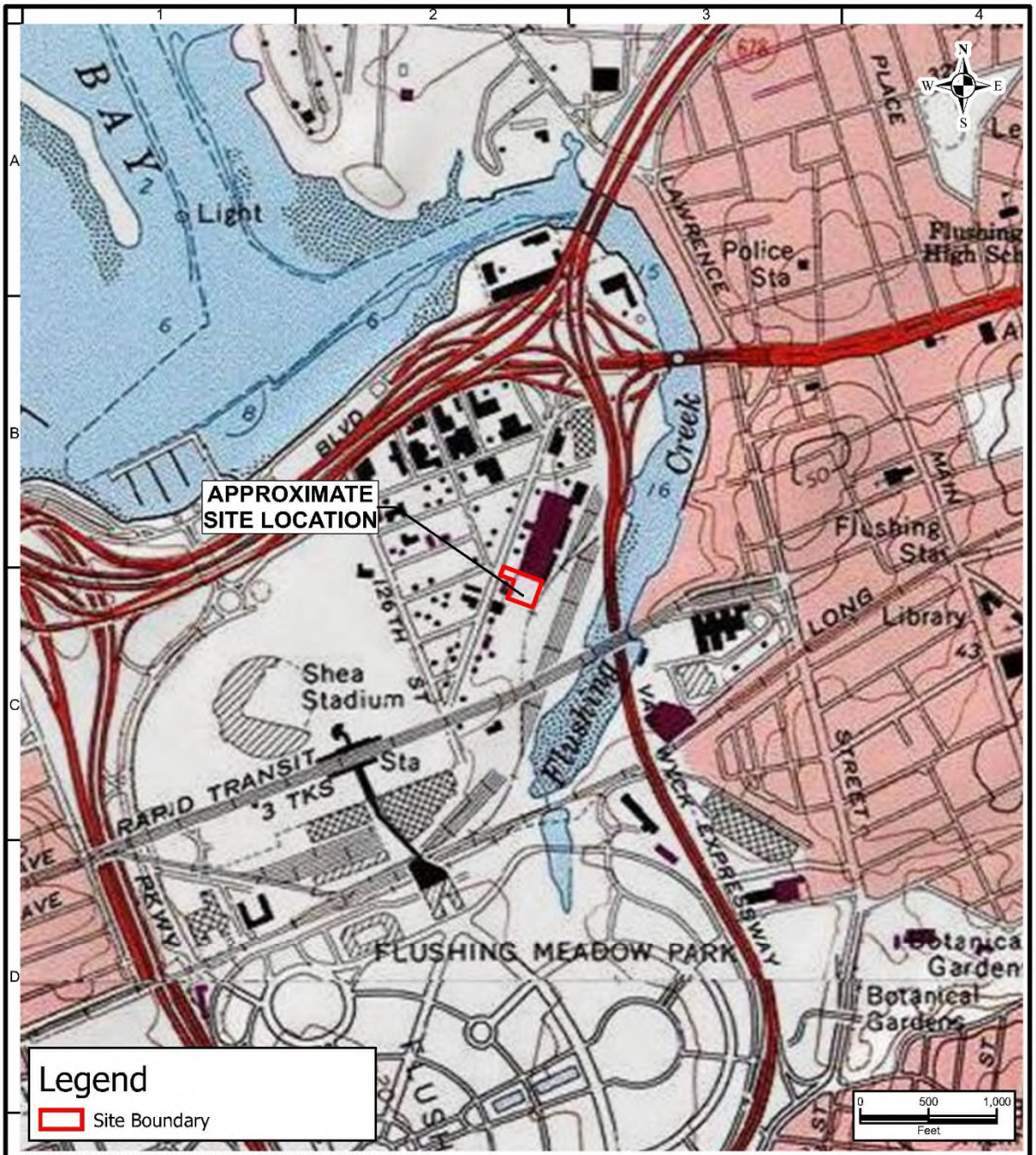
How to use Heat Index:
1. Across top locate Environmental Temperature
2. Down left side locate Relative Humidity
3. Follow across and down to find Apparent Temperature
4. Determine Heat Stress Risk on chart at right

Note: Exposure to full sunshine can increase Heat Index values by up to 15 degrees F.

Apparent Temperature	Heat Stress Risk with Physical Activity and/or Prolonged Exposure
90-105	Heat Cramps or Heat Exhaustion Possible
105-130	Heat Cramps or Heat Exhaustion Likely, Heat Stroke Possible
>130	Heatstroke Highly Likely

FIGURES

FIGURE 1
SITE LOCATION MAP



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LANGAN 21 Penn Plaza, 360 West 31st Street, 8th Floor New York, NY 10001-2727 T: 212.479.5400 F: 212.479.5444 www.langan.com Langan Engineering & Environmental Services, Inc. Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C. Langan International Collectively known as Langan	Project **Willets Point Development L-Parcel** CORONA QUEENS COUNTY NEW YORK	Drawing Title **SITE LOCATION**	Project No. 170197605 Date 10/23/2023 Scale 1:1,000 Drawn By Site Analyzer Submission Date 10/23/2023	Figure 1 Sheet 1 of 1

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Spatial Reference: NAD 1983 StatePlane New York Long Island FIPS 3104 Feet
Warning: It is a violation of the NYS Education Law Article 145 for any person, unless acting under the direction of a licensed professional engineer, land surveyor or geologist, to alter this item in any way.

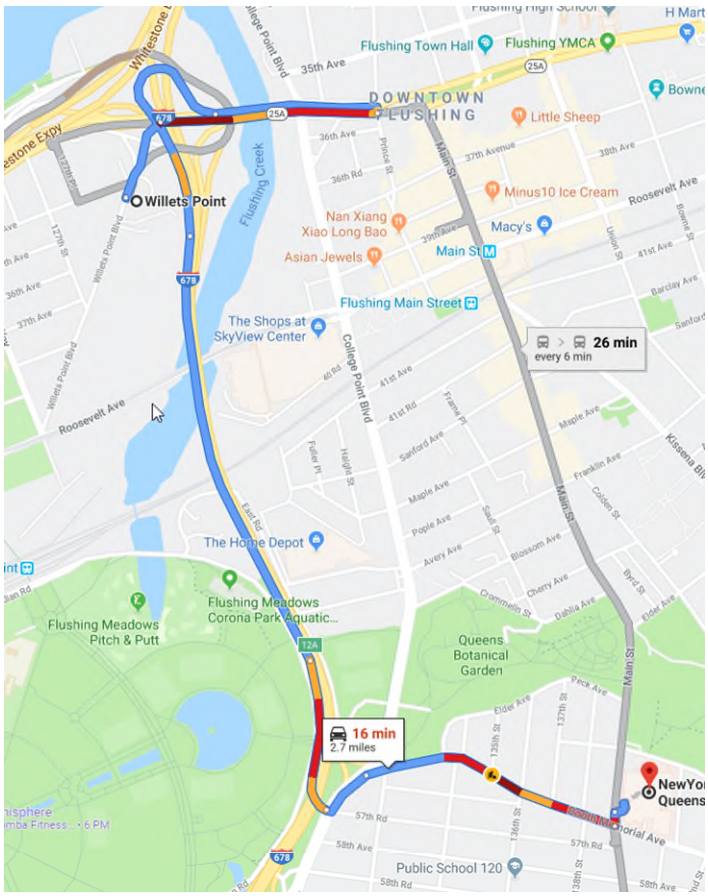
FIGURE 2
HOSPITAL ROUTE PLAN

Hospital Location: **New York Presbyterian Queens Hospital**
56-45 Main Street
Flushing, New York
718-670-1231

START: 126th Street and Willets Point Boulevard, Queens, New York

1. Head north on Willets Point Boulevard toward 34th Avenue
2. Slight right onto NY-25A E/Northern Boulevard
3. Make a U-turn at Prince Street
4. Use the right lane to take the ramp to Kennedy Airport
5. Merge onto I-678 South
6. Take exit 12A for College Point Boulevard toward Interstate 495
7. Turn left onto College Point Boulevard
8. Slight right onto Booth Memorial Avenue
9. Turn left onto Main Street
10. Turn right, destination will be on the right.

END: New York Presbyterian Queens Hospital, 46-45 Main Street, Flushing, NY



ATTACHMENTS

ATTACHMENT A

STANDING ORDERS

STANDING ORDERS

GENERAL

- No smoking, eating, or drinking in this work zone.
- Upon leaving the work zone, personnel will thoroughly wash their hands and face.
- Minimize contact with contaminated materials through proper planning of work areas and decontamination areas, and by following proper procedures. Do not place equipment on the ground. Do not sit on contaminated materials.
- No open flames in the work zone.
- Only properly trained and equipped personnel are permitted to work in potentially contaminated areas.
- Always use the appropriate level of personal protective equipment (PPE).
- Maintain close contact with your buddy in the work zone.
- Contaminated material will be contained in the Exclusion Zone (EZ).
- Report any unusual conditions.
- Work areas will be kept clear and uncluttered. Debris and other slip, trip, and fall hazards will be removed as frequently as possible.
- The number of personnel and equipment in the work zone will be kept to an essential minimum.
- Be alert to the symptoms of fatigue and heat/cold stress, and their effects on the normal caution and judgment of personnel.
- Conflicting situations which may arise concerning safety requirements and working conditions must be addressed and resolved quickly by the site HSO.

TOOLS AND HEAVY EQUIPMENT

- Do not, under any circumstances, enter or ride in or on any backhoe bucket, materials hoist, or any other device not specifically designed to carry passengers.
- Loose-fitting clothing or loose long hair is prohibited around moving machinery.
- Ensure that heavy equipment operators and all other personnel in the work zone are using the same hand signals to communicate.
- Drilling/excavating within 10 feet in any direction of overhead power lines is prohibited.
- The locations of all underground utilities must be identified and marked out prior to initiating any subsurface activities.
- Check to ensure that the equipment operator has lowered all blades and buckets to the ground before shutting off the vehicle.
- If the equipment has an emergency stop device, have the operator show all personnel its location and how to activate it.
- Help the operator ensure adequate clearances when the equipment must negotiate in tight quarters; serve as a signal operator to direct backing, as necessary.
- Ensure that all heavy equipment that is used in the Exclusion Zone is kept in that zone until the job is done and that such equipment is completely decontaminated before moving it into the clean area of the work zone.
- Samplers must not reach into or get near rotating equipment such as the drill rig. If personnel must work near any tools that could rotate, the equipment operator must completely shut down the rig prior to initiating such work. It may be necessary to use a remote sampling device.

ATTACHMENT B

DECONTAMINATION PROCEDURES

PERSONNEL DECONTAMINATION

LEVEL C DECONTAMINATION

Station 1:	Equipment Drop	1. Deposit equipment used on-site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths. Segregation at the drop reduces the probability of cross-contamination. During hot weather operations, cool down stations may be set up within this area.
Station 2:	Outer Garment, Boots, and Gloves Wash and Rinse	2. Scrub outer boots, outer gloves, and chemical-resistant splash suit with decon solution or detergent and water. Rinse off using copious amounts of water.
Station 3:	Outer Boot and Glove Removal	3. Remove outer boots and gloves. Deposit in container with plastic liner.
Station 4:	Canister or Mask Change	4. If worker leaves Exclusion Zone to change canister (or mask), this is the last step in the decontamination procedure. Worker's canister is exchanged, new outer gloves and boot covers donned, joints taped, and worker returns to duty.
Station 5:	Boot, Gloves and Outer Garment Removal	5. Boots, chemical-resistant splash suit, inner gloves removed and deposited in separate containers lined with plastic.
Station 6:	Face piece Removal	6. Face piece is removed (avoid touching face with fingers). Face piece deposited on plastic sheets.
Station 7:	Field Wash	7. Hands and face are thoroughly washed. Shower as soon as possible.

LEVEL D DECONTAMINATION

Station 1:	Equipment Drop	1. Deposit equipment used on-site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths. Segregation at the drop reduces the probability of cross contamination. During hot weather operations, cool down stations may be set up within this area.
Station 2:	Outer Garment, Boots, and Gloves Wash and Rinse	2. Scrub outer boots, outer gloves and chemical-resistant splash suit with decon solution or detergent and water. Rinse off using copious amounts of water.
Station 3:	Outer Boot and Glove Removal	3. Remove outer boots and gloves. Deposit in container with plastic liner.
Station 4:	Boot, Gloves and Outer Garment Removal	4. Boots, chemical-resistant splash suit, inner gloves removed and deposited in separate containers lined with plastic.
Station 5:	Field Wash	5. Hands and face are thoroughly washed. Shower as soon as possible.

EQUIPMENT DECONTAMINATION

GENERAL:

Equipment to be decontaminated during the project may include tools, monitoring equipment, respirators, sampling containers, laboratory equipment, and drilling equipment.

All decontamination will be done by personnel in protective gear, appropriate for the level of decontamination, as determined by the site HSO. The decontamination work tasks will be split or rotated among support and work crews.

Depending on site conditions, backhoes and pumps may be decontaminated over a portable decontamination pad to contain wash water; or wash water may be allowed to run off into a storm sewer system. Equipment needed may include a steam generator with high-pressure water, empty drums, screens, screen support structures, and shovels. Drums will be used to hold contaminated wash water pumped from the lined pit. These drums will be labeled as such.

Miscellaneous tools and equipment will be dropped into a plastic bucket, tub, or other containers. They will be brushed off and rinsed with a detergent solution, and finally rinsed with clean water.

MONITORING EQUIPMENT:

Monitoring equipment will be protected as much as possible from contamination by draping, masking, or otherwise covering as many of the instruments as possible with plastic without hindering the operation of the unit. The PID, HNu, or OVA meter, for example, can be placed in a clear plastic bag, which allows reading of the scale and operation of knobs. The probes can be partially wrapped keeping the sensor tip and discharge port clear.

The contaminated equipment will be taken from the drop area and the protective coverings removed and disposed of in the appropriate containers. Any dirt or obvious contamination will be brushed or wiped with a disposable paper wipe.

RESPIRATORS:

Respirators will be cleaned and disinfected after every use. Taken from the drop area, the masks (with the cartridges removed and disposed of with other used disposable gear) will be immersed in a cleaning solution and scrubbed gently with a soft brush, followed by a rinse in plain warm water, and then allowed to air dry. In the morning, new cartridges will be installed. Personnel will inspect their own masks for serviceability prior to donning them. And, once the mask is on, the wearer will check the respirator for leakage using the negative and positive pressure fit check techniques.

ATTACHMENT C

EMPLOYEE EXPOSURE/INJURY INCIDENT REPORT

EMPLOYEE INCIDENT/INJURY REPORT
LANGAN ENGINEERING & ENVIRONMENTAL SERVICES

(Complete and return to Tony Moffa in the Doylestown Office)

Affected Employee Name: _____ Date: _____

Incident type: ☐ Injury ☐ Report Only/No Injury
☐ Near Miss ☐ Other: _____

EMPLOYEE INFORMATION (Person completing Form)

Employee Name: _____ Employee No: _____

Title: _____ Office Location: _____

Length of time employed or date of hire: _____

Mailing address: _____

_____

Sex: M ☐ F ☐ Birth date: _____

Business phone & extension: _____ Residence/cell phone: _____

ACCIDENT INFORMATION

Project: _____ Project #: _____

Date & time of incident: _____ Time work started & ended: _____

Site location: _____

Incident Type: Possible Exposure ☐ Exposure ☐ Physical Injury ☐

Names of person(s) who witnessed the incident:_____

_____

_____

Exact location incident occurred:

_____

_____

Describe work being done:_____

_____

_____

_____

Describe what affected employee was doing prior to the incident occurring:

_____

_____

_____

Describe in detail how the incident occurred:

_____

_____

_____

_____

Nature of the incident (List the parts of the body affected):

_____

_____

_____

_____

Person(s) to whom the incident was reported (Time and Date):

_____

_____

List the names of other persons affected during this incident:

_____

_____

Possible causes of the incident (equipment, unsafe work practices, lack of PPE, etc.):

Weather conditions during incident:

MEDICAL CARE INFORMATION

Did affected employee receive medical care? Yes ☐ No ☐

If Yes, when, and where was medical care received:

Provide name of facility (hospital, clinic, etc.):

Length of stay at the facility?

Did the employee miss any work time? Yes ☐ No ☐ Undetermined ☐

Date employee last worked: Date employee returned to work:

Has the employee returned to work? Yes ☐ No ☐

Does the employee have any work limitations or restrictions from the injury? : Yes ☐ No ☐

If Yes, please describe:

Did the exposure/injury result in permanent disability? Yes ☐ No ☐ Unknown ☐

If Yes, please describe:

HEALTH & SAFETY INFORMATION

Was the operation being conducted under an established site-specific CONSTRUCTION HEALTH AND SAFETY PLAN?
Yes ☐ No ☐ Not Applicable: ☐

Describe protective equipment and clothing used by the employee:

Did any limitations in safety equipment or protective clothing contribute to or affect exposure/injury? If so, explain:

Employee Signature Date

Langan Representative Date

ATTACHMENT D

CALIBRATION LOG

DATE:_____ **PROJECT:**_____

CALIBRATION LOG

Date & Time	Inst Type	Inst #	Media	Initial Reading	Span #	Calibrate. Reading	Performed By:

ATTACHMENT E

MATERIAL SAFETY DATA SHEETS
SAFETY DATA SHEETS

All Langan Field Personnel Completing This Work Plan Are To Have Real-Time Accessibility To Material Safety Data Sheets (MSDS) or Safety Data Sheets (SDSs) Through Their Smart Phone.

The link is http://www.msds.com/
The login name is "drapehead"
The password is "2angan987"

If You Are Unable To Use the Smart Phone App, You Are To Bring Printed Copies of the MSDS/SDSs to the Site

SAFETY DATA SHEET

Version 5.3
Revision Date 12/29/2015
Print Date 04/11/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : 1,1-Dichloroethane

Product Number : 48512
Brand : Supelco
Index-No. : 602-011-00-1

CAS-No. : 75-34-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 2), H225
Acute toxicity, Oral (Category 4), H302
Eye irritation (Category 2A), H319
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Acute aquatic toxicity (Category 3), H402
Chronic aquatic toxicity (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H225 Highly flammable liquid and vapour.
H302 Harmful if swallowed.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.
H412 Harmful to aquatic life with long lasting effects.

Precautionary statement(s)
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.

P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ eye protection/ face protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell. Rinse mouth.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	Ethylidene chloride
Formula	:	$C_2H_4Cl_2$
Molecular weight	:	98.96 g/mol
CAS-No.	:	75-34-3
EC-No.	:	200-863-5
Index-No.	:	602-011-00-1

Hazardous components

Component	Classification	Concentration
1,1-Dichloroethane		
	Flam. Liq. 2; Acute Tox. 4; Eye Irrit. 2A; STOT SE 3; Aquatic Acute 3; Aquatic Chronic 3; H225, H302, H319, H335, H412	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Use explosion-proof equipment.Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): Flammable liquids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
1,1-Dichloroethane	75-34-3	TWA	100.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Upper Respiratory Tract irritation Eye irritation Liver damage Kidney damage Not classifiable as a human carcinogen		
		TWA	100.000000 ppm 400.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		See Appendix C		
		TWA	100.000000 ppm 400.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: butyl-rubber
Minimum layer thickness: 0.3 mm
Break through time: 60 min
Material tested:Butoject® (KCL 897 / Aldrich Z677647, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering

controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	-97.99 °C (-144.38 °F)
f)	Initial boiling point and boiling range	55.0 - 58.0 °C (131.0 - 136.4 °F)
g)	Flash point	-9.99 °C (14.02 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	1.17 g/cm3
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Vapours may form explosive mixture with air.

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 725.0 mg/kg

LC50 Inhalation - Rat - 4 h - 13000 ppm

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
Chronic exposure may cause dermatitis.

Germ cell mutagenicity
No data available

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
May cause respiratory irritation.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: KI0175000

Liver injury may occur., Kidney injury may occur., narcosis, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Central nervous system -

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Harmful to aquatic life.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 2362 Class: 3 Packing group: II
Proper shipping name: 1,1-Dichloroethane
Reportable Quantity (RQ): 1000 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 2362 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: 1,1-DICHLOROETHANE

IATA
UN number: 2362 Class: 3 Packing group: II
Proper shipping name: 1,1-Dichloroethane

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
1,1-Dichloroethane	75-34-3	2007-07-01

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
1,1-Dichloroethane	75-34-3	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
1,1-Dichloroethane	75-34-3	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
1,1-Dichloroethane	75-34-3	2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No.	Revision Date
1,1-Dichloroethane	75-34-3	2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Eye Irrit.	Eye irritation
Flam. Liq.	Flammable liquids
H225	Highly flammable liquid and vapour.
H302	Harmful if swallowed.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	3
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	3
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.3 Revision Date: 12/29/2015 Print Date: 04/11/2016

SAFETY DATA SHEET

Creation Date 26-Sep-2009 **Revision Date** 31-Jan-2023 **Revision Number** 9

1. Identification

Product Name **Mesitylene**

Cat No. : **AC125580000; AC125580010; AC125580025; AC125580050; AC125582500**

CAS No 108-67-8
Synonyms 1,3,5-Trimethylbenzene

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company

Fisher Scientific Company
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable liquids	Category 3
Skin Corrosion/Irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system, Central nervous system (CNS).	
Aspiration Toxicity	Category 1

Label Elements

Signal Word
Danger

Hazard Statements

Flammable liquid and vapor
May be fatal if swallowed and enters airways
Causes skin irritation
Causes serious eye irritation
May cause respiratory irritation

Precautionary Statements
Prevention
Wash face, hands and any exposed skin thoroughly after handling
Wear protective gloves/protective clothing/eye protection/face protection
Avoid breathing dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Keep container tightly closed
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting equipment
Use only non-sparking tools
Take precautionary measures against static discharge
Keep cool
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor/physician if you feel unwell
Skin
If skin irritation occurs: Get medical advice/attention
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
Wash contaminated clothing before reuse
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
Ingestion
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
Do NOT induce vomiting
Fire
In case of fire: Use CO2, dry chemical, or foam for extinction
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Toxic to aquatic life with long lasting effects

3. Composition/Information on Ingredients

Component	CAS No	Weight %
1,3,5-Trimethylbenzene	108-67-8	<100

4. First-aid measures

General Advice	If symptoms persist, call a physician.
Eye Contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.
Skin Contact	Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.
Inhalation	Remove to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur. Risk of serious damage to the lungs (by aspiration).
Ingestion	Clean mouth with water and drink afterwards plenty of water. Do NOT induce vomiting. Call a physician or poison control center immediately. If vomiting occurs naturally, have victim lean forward.
Most important symptoms and effects	None reasonably foreseeable. Vapors may cause drowsiness and dizziness: Symptoms may be delayed: Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Water spray, carbon dioxide (CO2), dry chemical, alcohol-resistant foam. Water mist may be used to cool closed containers.
Unsuitable Extinguishing Media	No information available
Flash Point	44 °C / 111.2 °F
Method -	No information available
Autoignition Temperature	550 °C / 1022 °F

Explosion Limits

Upper	6.00%
Lower	1.00%
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical
Flammable. Containers may explode when heated. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back.

Hazardous Combustion Products
Carbon monoxide (CO). Carbon dioxide (CO_2).
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
3	2	0	N/A

6. Accidental release measures

Personal Precautions	Ensure adequate ventilation. Use personal protective equipment as required. Remove all sources of ignition. Take precautionary measures against static discharges.
Environmental Precautions	Do not flush into surface water or sanitary sewer system.

Methods for Containment and Clean Up Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.

7. Handling and storage

Handling Wear personal protective equipment/face protection. Ensure adequate ventilation. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation. Keep away from open flames, hot surfaces and sources of ignition. Use only non-sparking tools. Take precautionary measures against static discharges.

Storage. Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat, sparks and flame. Flammables area. Incompatible Materials. Strong oxidizing agents. Nitric acid.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH	Mexico OEL (TWA)
1,3,5-Trimethylbenzene	TWA: 10 ppm		TWA: 25 ppm TWA: 125 mg/m^3	

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
NIOSH: NIOSH - National Institute for Occupational Safety and Health

Engineering Measures Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location. Use explosion-proof electrical/ventilating/lighting equipment.

Personal Protective Equipment

Eye/face Protection Tight sealing safety goggles. Face protection shield.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Recommended Filter type: Organic gases and vapours filter. Type A. Brown. conforming to EN14387.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	aromatic
Odor Threshold	No information available
pH	No information available
Melting Point/Range	-45 °C / -49 °F
Boiling Point/Range	163 - 166 °C / 325.4 - 330.8 °F @ 760 mmHg
Flash Point	44 °C / 111.2 °F
Evaporation Rate	No information available
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	6.00%
Lower	1.00%

Vapor Pressure	2.5 mbar @ 20 °C
Vapor Density	4.1 (Air = 1.0)
Specific Gravity	0.868
Solubility	Slightly soluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	550 °C / 1022 °F
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	C9 H12
Molecular Weight	120.19

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products. Excess heat. Keep away from open flames, hot surfaces and sources of ignition.

Incompatible Materials Strong oxidizing agents, Nitric acid

Hazardous Decomposition Products Carbon monoxide (CO), Carbon dioxide (CO_2)

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
1,3,5-Trimethylbenzene	Not listed	Not listed	LC50 = 24 g/m³ (Rat) 4 h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Irritating to eyes, respiratory system and skin

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
1,3,5-Trimethylbenzene	108-67-8	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects Not mutagenic in AMES Test

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system Central nervous system (CNS)

STOT - repeated exposure None known

Aspiration hazard Category 1

Symptoms / effects,both acute and delayed Vapors may cause drowsiness and dizziness: Symptoms may be delayed: Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. The product contains following substances which are hazardous for the environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
1,3,5-Trimethylbenzene	Not listed	LC50: = 3.48 mg/L, 96h (Pimephales promelas)	Not listed	Not listed

Persistence and Degradability based on information available. May persist

Bioaccumulation/ Accumulation No information available.

Mobility Is not likely mobile in the environment due its low water solubility.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No UN2325
Proper Shipping Name 1,3,5-TRIMETHYLBENZENE
Hazard Class 3
Packing Group III

TDG

UN-No UN2325
Proper Shipping Name 1,3,5-TRIMETHYLBENZENE
Hazard Class 3
Packing Group III

IATA

UN-No UN2325
Proper Shipping Name 1,3,5-TRIMETHYLBENZENE
Hazard Class 3
Packing Group III

IMDG/IMO

UN-No UN2325
Proper Shipping Name 1,3,5-TRIMETHYLBENZENE
Hazard Class 3
Packing Group III

15. Regulatory information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	TSCA - EPA Regulatory Flags
1,3,5-Trimethylbenzene	108-67-8	X	ACTIVE	-

Legend:
TSCA US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA - Per 40 CFR 751, Regulation of Certain Chemical Substances & Mixtures, Under TSCA Section 6(h) (PBT) Not applicable

TSCA 12(b) - Notices of Export Not applicable

International Inventories
Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), China (IECSC), Korea (KECL).

Component	CAS No	DSL	NDSL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
1,3,5-Trimethylbenzene	108-67-8	X	-	203-604-4	X	X	X	X	X	KE-34411

KECL - NIER number or KE number (http://ncis.nier.go.kr/en/main.do)

U.S. Federal Regulations

SARA 313 Not applicable

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act) Not applicable

Clean Air Act Not applicable

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA Not applicable

California Proposition 65 This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
1,3,5-Trimethylbenzene	X	-	-	-	-

U.S. Department of Transportation
Reportable Quantity (RQ): N
DOT Marine Pollutant Y
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade Moderate risk, Grade 2

Authorisation/Restrictions according to EU REACH Not applicable

Component	CAS No	REACH (1907/2006) - Annex XIV - Substances Subject to Authorization	REACH (1907/2006) - Annex XVII - Restrictions on Certain Dangerous Substances	REACH Regulation (EC 1907/2006) article 59 - Candidate List of Substances of Very High

				Concern (SVHC)
1,3,5-Trimethylbenzene	108-67-8	-	-	-

Safety, health and environmental regulations/legislation specific for the substance or mixture

Component	CAS No	OECD HPV	Persistent Organic Pollutant	Ozone Depletion Potential	Restriction of Hazardous Substances (RoHS)
1,3,5-Trimethylbenzene	108-67-8	Listed	Not applicable	Not applicable	Not applicable

Component	CAS No	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)
1,3,5-Trimethylbenzene	108-67-8	Not applicable	Not applicable	Not applicable	Not applicable

16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 26-Sep-2009
Revision Date 31-Jan-2023
Print Date 31-Jan-2023
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

SAFETY DATA SHEET

Version 6.8
Revision Date 09/07/2024
Print Date 09/08/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : 1,3,5-Trimethoxybenzene

Product Number : 138827
Brand : Aldrich
CAS-No. : 621-23-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 4), H302

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

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Pictogram	
Signal Word	Warning
Hazard Statements	
H302	Harmful if swallowed.
Precautionary Statements	
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell. Rinse mouth.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Phloroglucinol trimethyl ether
Formula	:	$C_9H_{12}O_3$
Molecular weight	:	168.19 g/mol
CAS-No.	:	621-23-8
EC-No.	:	210-673-4

Component	Classification	Concentration
1,3,5-trimethoxybenzene		
	Acute Tox. 4; H302	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

In case of eye contact
After eye contact: rinse out with plenty of water. Remove contact lenses.

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If swallowed
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Water Foam Carbon dioxide (CO2) Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Carbon oxides
Combustible.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters
In the event of fire, wear self-contained breathing apparatus.

5.4 Further information
Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Avoid inhalation of dusts. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up dry. Dispose of properly. Clean up affected area. Avoid generation of dusts.

6.4 Reference to other sections
For disposal see section 13.

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SECTION 7: Handling and storage

7.1 Precautions for safe handling

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Dry.

Storage class
Storage class (TRGS 510): 11: Combustible Solids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Change contaminated clothing. Preventive skin protection recommended. Wash hands after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Splash contact
Material: Nitrile rubber

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Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

Body Protection
protective clothing

Respiratory protection
Recommended Filter type: Filter type P2
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when dusts are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: crystalline Color: colorless
b)	Odor	No data available
c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/ range: 50 - 53 °C (122 - 127 °F) - lit.
f)	Initial boiling point and boiling range	255 °C 491 °F - lit.
g)	Flash point	86.00 °C (186.80 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Density	No data available
	Relative density	No data available
n)	Water solubility	No data available

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o)	Partition coefficient: n-octanol/water	log Pow: 1.965
p)	Autoignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	Not classified as explosive.
t)	Oxidizing properties	none

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
The following applies in general to flammable organic substances and mixtures: in correspondingly fine distribution, when whirled up a dust explosion potential may generally be assumed.

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
Violent reactions possible with:
Strong oxidizing agents

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Mouse - 1,480 mg/kg
Remarks: (RTECS)
Inhalation: No data available
Dermal: No data available
No data available

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Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

RTECS: DC2810000
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Hazardous properties cannot be excluded but are unlikely when the product is handled appropriately.

Handle in accordance with good industrial hygiene and safety practice.

SECTION 12: Ecological information

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

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12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties
No data available

12.7 Other adverse effects
No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)
Not dangerous goods

IMDG
Not dangerous goods

IATA
Not dangerous goods

Further information
Not classified as dangerous in the meaning of transport regulations.

SECTION 15: Regulatory information

CERCLA Reportable Quantity
This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity
This material does not contain any components with a section 304 EHS RQ.

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SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Acute Health Hazard

SARA 313 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Clean Air Act

This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).
This product does not contain any hazardous air pollutants (HAP), as defined by the U.S. Clean Air Act Section 112 (40 CFR 61).
This product does not contain any chemicals listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F).
This product does not contain any chemicals listed under the U.S. Clean Air Act Section 111 SOCMI Intermediate or Final VOC's (40 CFR 60.489).

Clean Water Act

This product does not contain any Hazardous Substances listed under the U.S. CleanWater Act, Section 311, Table 116.4A.
This product does not contain any Hazardous Chemicals listed under the U.S. CleanWater Act, Section 311, Table 117.3.
This product does not contain any toxic pollutants listed under the U.S. Clean Water Act Section 307
This product does not contain any priority pollutants related to the U.S. Clean Water Act

US State Regulations

Massachusetts Right To Know

No components are subject to the Massachusetts Right to Know Act.

Maine Chemicals of High Concern

Product does not contain any listed chemicals

Vermont Chemicals of High Concern

Product does not contain any listed chemicals

Washington Chemicals of High Concern

Product does not contain any listed chemicals

The ingredients of this product are reported in the following inventories:

TSCA : All substances listed as active on the TSCA inventory

TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

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SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.8 Revision Date: 09/07/2024 Print Date: 09/08/2024

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SAFETY DATA SHEET

Version 5.4
Revision Date 03/03/2015
Print Date 04/11/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name	:	1,4-Dioxane
Product Number	:	296309
Brand	:	Sigma-Aldrich
Index-No.	:	603-024-00-5
CAS-No.	:	123-91-1

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+1 800-325-5832
Fax	:	+1 800-325-5052

1.4 Emergency telephone number

Emergency Phone #	:	(314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 2), H225
Eye irritation (Category 2A), H319
Carcinogenicity (Category 2), H351
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word: Danger

Hazard statement(s)

H225	Highly flammable liquid and vapour.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H351	Suspected of causing cancer.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P210	Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P233	Keep container tightly closed.

P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/ eye protection/ face protection.
P281	Use personal protective equipment as required.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P312	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

May form explosive peroxides., Repeated exposure may cause skin dryness or cracking.
May form explosive peroxides.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	Dioxane Diethylene oxide
Formula	:	$C_4H_8O_2$
Molecular weight	:	88.11 g/mol
CAS-No.	:	123-91-1
EC-No.	:	204-661-8
Index-No.	:	603-024-00-5
Registration number	:	01-2119462837-26-XXXX

Hazardous components

Component	Classification	Concentration
1,4-Dioxane		
	Flam. Liq. 2; Eye Irrit. 2A; Carc. 2; STOT SE 3; H225, H319, H335, H351	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Use explosion-proof equipment.Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): Flammable liquids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
1,4-Dioxane	123-91-1	TWA	20.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Liver damage Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption		
		TWA	20 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Liver damage Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption		
		TWA	25 ppm 90 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		Skin notation		
		TWA	100.000000 ppm 360.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Skin designation The value in mg/m3 is approximate.		
		TWA	100 ppm 360 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Skin designation The value in mg/m3 is approximate.		
		C	1.000000 ppm 3.600000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen See Appendix A 30 minute ceiling value		

Derived No Effect Level (DNEL)

Application Area	Exposure routes	Health effect	Value
Workers	Inhalation	Long-term local effects	144 mg/m3
Workers	Inhalation	Long-term systemic effects	73 mg/m3
Workers	Skin contact	Long-term systemic effects	21 mg/m3

Predicted No Effect Concentration (PNEC)

Compartment	Value
Soil	0.153 mg/kg
Marine water	0.67 mg/l
Fresh water	10 mg/l
Fresh water sediment	37 mg/kg
Sewage treatment plant	2700 mg/l
Aquatic intermittent release	10 mg/l

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: butyl-rubber
Minimum layer thickness: 0.3 mm
Break through time: 480 min
Material tested:Butoject® (KCL 897 / Aldrich Z677647, Size M)

Splash contact
Material: Chloroprene
Minimum layer thickness: 0.6 mm
Break through time: 35 min
Material tested:Camapren® (KCL 722 / Aldrich Z677493, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	6.0 - 8 at 500 g/l at 20 °C (68 °F)
e)	Melting point/freezing point	Melting point/range: 10 - 12 °C (50 - 54 °F) - lit.
f)	Initial boiling point and boiling range	100 - 102 °C (212 - 216 °F) - lit.
g)	Flash point	12 °C (54 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 22 %(V) Lower explosion limit: 2 %(V)
k)	Vapour pressure	36 hPa (27 mmHg) at 20 °C (68 °F) 53 hPa (40 mmHg) at 25.20 °C (77.36 °F)
l)	Vapour density	3.04 - (Air = 1.0)

m)	Relative density	1.034 g/cm3 at 25 °C (77 °F)
n)	Water solubility	completely miscible
o)	Partition coefficient: n-octanol/water	log Pow: -0.27
p)	Auto-ignition temperature	300 °C (572 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Surface tension	36.9 mN/m at 25 °C (77 °F)
Relative vapour density	3.04 - (Air = 1.0)

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.
Test for peroxide formation before distillation or evaporation. Test for peroxide formation or discard after 1 year.
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Vapours may form explosive mixture with air.Vapours may form explosive mixture with air.

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Oxygen, Oxidizing agents, Halogens, Reducing agents, Perchlorates., Trimethylaluminum

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 4,200 mg/kg

LC50 Inhalation - Rat - 2 h - 46,000 mg/m3
Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and Taste):Eye:Other.

LD50 Dermal - Rabbit - 7,858 mg/kg

No data available

Skin corrosion/irritation
Skin - Human
Remarks: Chronic exposure causes drying effect on the skin and eczema.

Skin - Rabbit
Result: No skin irritation

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Eye irritation - 24 h

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
Laboratory experiments have shown mutagenic effects.

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Limited evidence of carcinogenicity in animal studies

IARC:	2B - Group 2B: Possibly carcinogenic to humans (1,4-Dioxane)
NTP:	Reasonably anticipated to be a human carcinogen (1,4-Dioxane)
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
May cause respiratory irritation.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: JG8225000

Nausea, Vomiting, Weakness, Dizziness, Vertigo, Headache, Sweating, loss of appetite, Kidney injury may occur., Liver injury may occur.
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Liver - Irregularities - Based on Human Evidence
Liver - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - 985 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 8,450 mg/l - 24 h
Toxicity to algae	EC50 - Desmodesmus subspicatus (green algae) - > 500 mg/l - 72 h

12.2 Persistence and degradability

Biodegradability	Result: < 5 % - Not readily biodegradable.

12.3 Bioaccumulative potential
Does not bioaccumulate.

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1165 Class: 3 Packing group: II
Proper shipping name: Dioxane
Reportable Quantity (RQ): 100 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 1165 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: DIOXANE

IATA
UN number: 1165 Class: 3 Packing group: II
Proper shipping name: Dioxane

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
1,4-Dioxane	123-91-1	2007-07-01

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
1,4-Dioxane	123-91-1	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
1,4-Dioxane	123-91-1	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
1,4-Dioxane	123-91-1	2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No.	Revision Date
1,4-Dioxane	123-91-1	2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Carc.	Carcinogenicity
Eye Irrit.	Eye irritation
Flam. Liq.	Flammable liquids
H225	Highly flammable liquid and vapour.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H351	Suspected of causing cancer.
STOT SE	Specific target organ toxicity - single exposure

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	3
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	3
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.4 Revision Date: 03/03/2015 Print Date: 04/11/2016

N-METHYLPERFLUOROOCTANESULFONAMIDOACETIC ACID UNLABELED (MIX OF ISOMERS) 50 UG/ML IN METHANOL

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830 and according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Date of issue: 16/10/2018 Revision date: : Version: 1.0

ULM-10656-S

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product form : Mixtures

Product name : N-METHYLPERFLUOROOCTANESULFONAMIDOACETIC ACID UNLABELED (MIX OF ISOMERS) 50 UG/ML IN METHANOL

Product code : ULM-10656-S

1.2. Relevant identified uses of the substance or mixture and uses advised against

1.2.1. Relevant identified uses

Main use category : Professional use

Industrial/Professional use spec : For professional use only

1.2.2. Uses advised against

No additional information available

1.3. Details of the supplier of the safety data sheet

Cambridge Isotope Laboratories, Inc.
50 Frontage Road
Andover, MA 01810
USA

USA: 1-800-322-1174 Int: 1-978-749-8000
cilsales@isotope.com www.isotope.com

Emergency telephone number

Emergency numbers:

Chemtrec: 1-800-424-9300 (24 hours)
International: 1-703-741-5970 (24 hours)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Flam. Liq. 2	H225
Acute Tox. 3 (Oral)	H301
Acute Tox. 3 (Dermal)	H311
Acute Tox. 3 (Inhalation:vapour)	H331
Skin Irrit. 2	H315
Eye Irrit. 2A	H319
STOT SE 1	H370

Full text of hazard classes and H-statements : see section 16

Classification according to Directive 67/548/EEC [DSD] or 1999/45/EC [DPD]

F; R11
T; R39/23/24/25
Xi; R36/38

Full text of R-phrases: see section 16

GHS-US classification

Flam. Liq. 2	H225
Acute Tox. 3 (Oral)	H301
Acute Tox. 3 (Dermal)	H311
Acute Tox. 3 (Inhalation:vapour)	H331
Skin Irrit. 2	H315
Eye Irrit. 2A	H319
STOT SE 1	H370

Full text of H statements : see section 16

Adverse physicochemical, human health and environmental effects

Eyes, Kidney, Liver, Heart, Central nervous system. Highly flammable liquid and vapour. Causes damage to organs (eyes, kidneys, liver, heart, central nervous system) (if inhaled, if swallowed, in contact with skin). Toxic in contact with skin. Toxic if inhaled. Toxic if swallowed. Causes skin irritation. Causes serious eye irritation.

2.2. Label elements

Labeling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP) :

GHS02 GHS08 GHS06

Signal word (CLP) : Danger

Hazard statements (CLP) : H225 - Highly flammable liquid and vapour
H301+H311+H331 - Toxic if swallowed, in contact with skin or if inhaled
H315 - Causes skin irritation
H319 - Causes serious eye irritation
H370 - Causes damage to organs (eyes, heart, kidneys, liver, central nervous system) (in contact with skin, if inhaled, if swallowed)

Precautionary statements (CLP) : P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233 - Keep container tightly closed.
P240 - Ground/bond container and receiving equipment.
P241 - Use explosion-proof electrical, lighting, ventilating equipment
P260 - Do not breathe dust, mist, vapors, fume, gas, spray.
P264 - Wash hands, forearms and face thoroughly after handling.
P270 - Do not eat, drink or smoke when using this product.
P271 - Use only outdoors or in a well-ventilated area.

GHS-US labeling

Hazard pictograms (GHS-US) :

GHS02 GHS08 GHS06

Signal word (GHS-US) : Danger

Hazard statements (GHS-US) : H225 - Highly flammable liquid and vapour
H301+H311+H331 - Toxic if swallowed, in contact with skin or if inhaled
H315 - Causes skin irritation
H319 - Causes serious eye irritation
H370 - Causes damage to organs (eyes, kidneys, liver, heart, central nervous system) (Dermal, Inhalation, oral)

Precautionary statements (GHS-US) : P210 - Keep away from heat, open flames, sparks. - No smoking.
P233 - Keep container tightly closed.
P240 - Ground/Bond container and receiving equipment
P241 - Use explosion-proof electrical, lighting, ventilating equipment
P242 - Use only non-sparking tools.
P243 - Take precautionary measures against static discharge.
P260 - Do not breathe dust, fume, mist, gas, spray, vapors.
P261 - Avoid breathing dust, fume, gas, spray, vapors, mist.
P264 - Wash hands, forearms and face thoroughly after handling.
P270 - Do not eat, drink or smoke when using this product.
P271 - Use only outdoors or in a well-ventilated area.
P280 - Wear protective clothing, protective gloves.
P301+P310 - If swallowed: Immediately call a doctor, a POISON CENTER
P302+P352 - If on skin: Wash with plenty of water
P303+P361+P353 - If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing
P305+P351+P338 - If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P307+P311 - If exposed: Call a poison center/doctor
P311 - Call a doctor, a POISON CENTER

P312 - Call a doctor, a POISON CENTER if you feel unwell
P321 - Specific treatment (see Hazardous component(s) for labeling on this label)
P322 - Specific treatment (see Hazard pictograms (CLP) on this label)
P330 - Rinse mouth.
P332+P313 - If skin irritation occurs: Get medical advice/attention.
P337+P313 - If eye irritation persists: Get medical advice/attention.
P361+P364 - Take off immediately all contaminated clothing and wash it before reuse.
P362+P364 - Take off contaminated clothing and wash it before reuse.
P370+P378 - In case of fire: Use alcohol resistant foam, carbon dioxide (CO2), dry extinguishing powder to extinguish.
P403+P233 - Store in a well-ventilated place. Keep container tightly closed.
P403+P235 - Store in a well-ventilated place. Keep cool.
P405 - Store locked up.
P501 - Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation

2.3. Other hazards

PBT: not relevant – no registration required

SECTION 3: Composition/Information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

Name	Product identifier	%	Classification according to Directive 67/548/EEC
100% METHANOL UNLABELED	(CAS-No.) 67-56-1 (EC-No.) 200-659-6 (EC Index-No.) 603-001-00-X (REACH-no) 01-2119433307-44	99.9937	F; R11 T; R39/23/24/25 Xi; R36/38
N-METHYLPERFLUOROOCTANESULFONAMIDOACETIC ACID UNLABELED -	(CAS-No.) 2355-31-9 (EC Index-No.)	0.0063	Xi; R36/37/38

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
100% METHANOL UNLABELED	(CAS-No.) 67-56-1 (EC-No.) 200-659-6 (EC Index-No.) 603-001-00-X (REACH-no) 01-2119433307-44	99.9937	Flam. Liq. 2, H225 Acute Tox. 3 (Oral), H301 Acute Tox. 3 (Dermal), H311 Acute Tox. 3 (Inhalation:vapour), H331 Skin Irrit. 2, H315 Eye Irrit. 2, H319 STOT SE 1, H370
N-METHYLPERFLUOROOCTANESULFONAMIDOACETIC ACID UNLABELED -	(CAS-No.) 2355-31-9 (EC Index-No.)	0.0063	Skin Irrit. 2, H315 Eye Irrit. 2, H319 STOT SE 3, H335

Name	Product identifier	%	GHS-US classification
100% METHANOL UNLABELED	(CAS-No.) 67-56-1	99.9937	Flam. Liq. 2, H225 Acute Tox. 3 (Oral), H301 Acute Tox. 3 (Dermal), H311 Acute Tox. 3 (Inhalation:vapour), H331 Skin Irrit. 2, H315 Eye Irrit. 2A, H319 STOT SE 1, H370
N-METHYLPERFLUOROOCTANESULFONAMIDOACETIC ACID UNLABELED -	(CAS-No.) 2355-31-9	0.0063	Skin Irrit. 2, H315 Eye Irrit. 2A, H319 STOT SE 3, H335

Full text of R- and H- phrases: see section 16

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general : If medical advice is needed, have product container or label at hand. Call a physician immediately. Evacuate danger area.

First-aid measures after inhalation : Remove person to fresh air and keep comfortable for breathing. If not breathing, give artificial respiration. Call a doctor.

First-aid measures after skin contact : Rinse skin with water/shower. Take immediately victim to hospital. Remove/Take off immediately all contaminated clothing. If skin irritation occurs: Get medical advice/attention.

First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.

First-aid measures after ingestion : Do not induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth. Call a physician immediately.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/effects after inhalation : Toxic if inhaled.

Symptoms/effects after skin contact : Toxic in contact with skin. Causes skin irritation.

Symptoms/effects after eye contact : Causes serious eye irritation.

Symptoms/effects after ingestion : Toxic if swallowed.

4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Dry powder. Dry sand.

Unsuitable extinguishing media : Do not use a heavy water stream.

5.2. Special hazards arising from the substance or mixture

Fire hazard : Highly flammable liquid and vapour.

Reactivity : vapors may form flammable mixture with air. Highly flammable liquid and vapour.

5.3. Advice for firefighters

Firefighting instructions : Do not enter fire area without proper protective equipment, including respiratory protection.

Protection during firefighting : Do not attempt to take action without suitable protective equipment. Self-contained breathing apparatus. Complete protective clothing. Wear recommended personal protective equipment.

Other information : Use water spray to cool exposed surfaces.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

Emergency procedures : Wear respiratory protection. Do not breathe dust, mist, gas, spray, vapors, fume. Avoid contact with skin, eyes and clothing. Ventilate spillage area. Remove all sources of ignition. No open flames, no sparks, and no smoking. Ensure adequate air ventilation. Special attention should be given to low areas/pits where flammable vapors can accumulate.

6.1.2. For emergency responders

Protective equipment : Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection".

6.2. Environmental precautions

Prevent entry to sewers and public waters. Do not allow to enter drains or water courses. Avoid release to the environment.

6.3. Methods and material for containment and cleaning up

For containment : Dike and contain spill.

Methods for cleaning up : Take up liquid spill into absorbent material. Notify authorities if product enters sewers or public waters. This material and its container must be disposed of in a safe way, and as per local legislation.

Other information : Dispose of materials or solid residues at an authorized site.

6.4. Reference to other sections

For further information refer to section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Ground/bond container and receiving equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Flammable vapors may accumulate in the container. Use explosion-proof equipment. Wear personal protective equipment. Do not breathe dust, fume, gas, spray, vapors, mist. Do not get in eyes, on skin, or on clothing. Use only outdoors or in a well-ventilated area.

Hygiene measures : Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product. Wash contaminated clothing before reuse. Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures : Ground/bond container and receiving equipment. Store in a well-ventilated place. Keep container tightly closed. Store locked up.

Storage conditions : Store at room temperature away from light and moisture.

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

N-METHYLPERFLUOROOCTANESULFONAMIDOACETIC ACID UNLABELED (MIX OF ISOMERS) 50 UG/ML IN METHANOL		
Italy - Portugal - USA ACGIH	ACGIH TWA (ppm)	200.00000000 ppm Basis: USA. ACGIH Threshold Limit Values (TLV)
Italy - Portugal - USA ACGIH	ACGIH STEL (ppm)	250 ppm Basis: USA. ACGIH Threshold Limit Values (TLV)
Italy - Portugal - USA ACGIH	Remark (ACGIH)	Headache. Nausea. Dizziness. Eye damage. Substances for which there is a Biological Exposure Index or Indices (see BEI section). Danger of cutaneous absorption.
USA NIOSH	NIOSH REL (TWA) (mg/m³)	260 mg/m³ Basis: NIOSH Recommended Exposure Limits
USA NIOSH	NIOSH REL (TWA) (ppm)	200 ppm Basis: NIOSH Recommended Exposure Limits
USA NIOSH	NIOSH REL (STEL) (mg/m³)	325 mg/m³ Basis: NIOSH Recommended Exposure Limits
USA NIOSH	NIOSH REL (STEL) (ppm)	250 ppm Basis: NIOSH Recommended Exposure Limits
USA NIOSH	Remark (NIOSH)	Potential for dermal absorption.
USA OSHA	OSHA PEL (TWA) (mg/m³)	260 mg/m³ Basis: USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants - 1910.1000. California permissible exposure limits for chemical contaminants (Title 8, Article 107)
USA OSHA	OSHA PEL (TWA) (ppm)	200 ppm Basis: USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants - 1910.1000. California permissible exposure limits for chemical contaminants (Title 8, Article 107)
USA OSHA	OSHA PEL (STEL) (mg/m³)	325 mg/m³ Basis: USA. OSHA - Table Z-1 Limits for Air Contaminants - 1910.1000. California permissible exposure limits for chemical contaminants (Title 8, Article 107)
USA OSHA	OSHA PEL (STEL) (ppm)	250 ppm Basis: USA. OSHA - Table Z-1 Limits for Air Contaminants - 1910.1000. California permissible exposure limits for chemical contaminants (Title 8, Article 107)
USA OSHA	OSHA PEL (Ceiling) (ppm)	1000 ppm California permissible exposure limits for chemical contaminants (Title 8, Article 107)
USA OSHA	Remark (OSHA)	The value in mg/m3 is approximate. Skin notation.

100% METHANOL UNLABELED (67-56-1)		
Italy - Portugal - USA ACGIH	ACGIH TWA (ppm)	200.00000000 ppm Basis: USA. ACGIH Threshold Limit Values (TLV)
Italy - Portugal - USA ACGIH	ACGIH STEL (ppm)	250 ppm Basis: USA. ACGIH Threshold Limit Values (TLV)
Italy - Portugal - USA ACGIH	Remark (ACGIH)	Headache. Nausea. Dizziness. Eye damage. Substances for which there is a Biological Exposure Index or Indices (see BEI section). Danger of cutaneous absorption.
USA NIOSH	NIOSH REL (TWA) (mg/m³)	260 mg/m³ Basis: NIOSH Recommended Exposure Limits
USA NIOSH	NIOSH REL (TWA) (ppm)	200 ppm Basis: NIOSH Recommended Exposure Limits

100% METHANOL UNLABELED (67-56-1)		
USA NIOSH	NIOSH REL (STEL) (mg/m³)	325 mg/m³ Basis: NIOSH Recommended Exposure Limits
USA NIOSH	NIOSH REL (STEL) (ppm)	250 ppm Basis: NIOSH Recommended Exposure Limits
USA NIOSH	Remark (NIOSH)	Potential for dermal absorption.
USA OSHA	OSHA PEL (TWA) (mg/m³)	260 mg/m³ Basis: USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants - 1910.1000. California permissible exposure limits for chemical contaminants (Title 8, Article 107)
USA OSHA	OSHA PEL (TWA) (ppm)	200 ppm Basis: USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants - 1910.1000. California permissible exposure limits for chemical contaminants (Title 8, Article 107)
USA OSHA	OSHA PEL (STEL) (mg/m³)	325 mg/m³ Basis: USA. OSHA - Table Z-1 Limits for Air Contaminants - 1910.1000. California permissible exposure limits for chemical contaminants (Title 8, Article 107)
USA OSHA	OSHA PEL (STEL) (ppm)	250 ppm Basis: USA. OSHA - Table Z-1 Limits for Air Contaminants - 1910.1000. California permissible exposure limits for chemical contaminants (Title 8, Article 107)
USA OSHA	OSHA PEL (Ceiling) (ppm)	1000 ppm California permissible exposure limits for chemical contaminants (Title 8, Article 107)
USA OSHA	Remark (OSHA)	The value in mg/m3 is approximate. Skin notation.

N-METHYLPERFLUOROOCTANESULFONAMIDOACETIC ACID UNLABELED (MIX OF ISOMERS) 50 UG/ML IN METHANOL	
DNEL/DMEL (Workers)	
Acute - systemic effects, dermal	40 mg/kg bodyweight/day
Acute - systemic effects, inhalation	260 mg/m³
Acute - local effects, dermal	260 mg/cm²
Long-term - systemic effects, dermal	40 mg/kg bodyweight/day
Long-term - local effects, dermal	260 mg/cm²
Long-term - local effects, inhalation	260 mg/m³
DNEL/DMEL (General population)	
Acute - systemic effects, dermal	8 mg/kg body weight
Acute - systemic effects, inhalation	50 mg/m³
Acute - systemic effects, oral	8 mg/kg body weight
Acute - local effects, inhalation	50 mg/m³
Long-term - systemic effects,oral	8 mg/kg bodyweight/day
Long-term - systemic effects, inhalation	50 mg/m³
Long-term - systemic effects, dermal	8 mg/kg bodyweight/day
Long-term - local effects, inhalation	50 mg/m³
PNEC (Water)	
PNEC aqua (freshwater)	154 mg/l
PNEC aqua (marine water)	15.4 mg/l
PNEC (Sediment)	
PNEC sediment (freshwater)	570.4 mg/kg dwt
PNEC (Soil)	
PNEC soil	23.5 mg/kg dwt
PNEC (STP)	
PNEC sewage treatment plant	100 mg/kg

8.2. Exposure controls

Appropriate engineering controls : Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work.

Personal protective equipment	:	Gloves. Protective clothing. Protective goggles. Self-contained breathing apparatus.

Materials for protective clothing	:	Wear suitable protective clothing and gloves.
Hand protection	:	Wear suitable protective clothing and gloves.
Eye protection	:	Wear eye protection. Chemical goggles or face shield with safety glasses.
Skin and body protection	:	Wear suitable protective clothing, gloves and eye/face protection.
Respiratory protection	:	In case of inadequate ventilation wear respiratory protection. Approved supplied air respirator.
Environmental exposure controls	:	Avoid release to the environment.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

The properties listed below are for the solvent, the main component of this mixture.

Physical state	:	Liquid
Appearance	:	Liquid
Molecular mass	:	32.04 g/mol
Color	:	Colorless
Odor	:	Pungent
Odor threshold	:	No data available
pH	:	No data available
Relative evaporation rate (butyl acetate=1)	:	No data available
Melting point	:	-98 °C (-144 °F)
Freezing point	:	No data available
Boiling point	:	64.7 °C (148.5 °F)
Flash point	:	9.7 °C (49.5 °F) - closed cup
Auto-ignition temperature	:	455 °C (851 °F) at 1,013 hPa (760 mmHg)
Decomposition temperature	:	No data available
Flammability (solid, gas)	:	No data available
Vapor pressure	:	130.3 hPa (97.7 mmHg) at 20 °C (68 °F); 169.27 hPa (126.96 mmHg) at 25 °C (77 °F)
Vapor pressure at 50 °C	:	546.6 hPa (410 mmHg) at 50 °C (122 °F)
Relative vapor density at 20 °C	:	1.11
Relative density	:	No data available
Specific gravity / density	:	0.791 g/ml at 25 °C (77 °F)
Solubility	:	Water: Completely miscible
Log Pow	:	-0.77
Log Kow	:	No data available
Viscosity, kinematic	:	No data available
Viscosity, dynamic	:	No data available
Explosive properties	:	Product is not explosive.
Oxidizing properties	:	Non oxidizing material according to EC criteria.
Explosion limits	:	6 - 36 % (V)

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

vapors may form flammable mixture with air. Highly flammable liquid and vapour.

10.2. Chemical stability

See storage and expiration date on CoA.

10.3. Possibility of hazardous reactions

No dangerous reactions known under normal conditions of use.

10.4. Conditions to avoid

Avoid contact with hot surfaces. Heat. No flames, no sparks. Eliminate all sources of ignition.

10.5. Incompatible materials

Acid anhydrides. Acid chlorides. Oxidizing agent. Alkali Metal Amides. Reducing agents. Acids.

10.6. Hazardous decomposition products

Carbon oxides (CO, CO2).

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Oral: Toxic if swallowed. Dermal: Toxic in contact with skin. Inhalation:vapour: Toxic if inhaled.

N-METHYLPERFLUOROOCTANESULFONAMIDOACETIC ACID UNLABELED (MIX OF ISOMERS) 50 UG/ML IN METHANOL	
LD50 oral rat	1187 - 2769 mg/kg
LD50 dermal rabbit	17100 mg/kg
LC50 inhalation rat (mg/l)	128.2 mg/l/4h ; 87.6 mg/l - 6 h
ATE CLP (oral)	100.000 mg/kg body weight
ATE CLP (dermal)	300.000 mg/kg body weight
ATE CLP (vapors)	3.000 mg/l/4h
ATE CLP (dust, mist)	128.200 mg/l/4h
LDLO, oral, human	143 mg/kg Remarks: Lungs, Thorax, or Respiration: Dyspnea. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

100% METHANOL UNLABELED (67-56-1)	
LD50 oral rat	1187 - 2769 mg/kg
LD50 dermal rabbit	17100 mg/kg
LC50 inhalation rat (mg/l)	128.2 mg/l/4h ; 87.6 mg/l - 6 h
ATE CLP (oral)	100.000 mg/kg body weight
ATE CLP (dermal)	300.000 mg/kg body weight
ATE CLP (vapors)	3.000 mg/l/4h
ATE CLP (dust, mist)	128.200 mg/l/4h
LDLO, oral, human	143 mg/kg Remarks: Lungs, Thorax, or Respiration: Dyspnea. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

Skin corrosion/irritation : Skin. rabbit. Result: No skin irritation

Serious eye damage/irritation : Eyes. rabbit. Result: No eye irritation

Respiratory or skin sensitization : Maximisation Test . Guinea pig. Did not cause sensitization. (OECD 406 method)

Germ cell mutagenicity : AMES test : S. tymphimurium. Result: negative. fibroblast. Result: Negative. Mutation in mammalian somatic cells. Mutagenicity (in vivo mammalian bone-marrow cytogenetic test, chromosomal analysis) - Mouse - male and female Result: negative. Mouse - male and female. Result: Negative

Carcinogenicity : Not classified

Reproductive toxicity : Damage to fetus not classifiable. Fertility classification not possible from current data.

Specific target organ toxicity – single exposure : Causes damage to organs through prolonged or repeated exposure

Causes damage to organs

Specific target organ toxicity – repeated exposure : The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

No data available

Aspiration hazard : No aspiration toxicity classification.

Potential Adverse human health effects and symptoms : This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product. Effects due to Ingestion may include: Headache. Dizziness. Drowsiness. metabolic acidosis. Coma. May be fatal if swallowed and enters airways. If swallowed there is a risk of blindness. Effects on humans. stomach.

Symptoms/effects after inhalation : Toxic if inhaled.

Symptoms/effects after skin contact : Toxic in contact with skin. Causes skin irritation.

Symptoms/effects after eye contact : Causes serious eye irritation.

Symptoms/effects after ingestion : Toxic if swallowed.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : The product is not considered harmful to aquatic organisms or to cause long-term adverse effects in the environment.

N-METHYLPERFLUOROOCTANESULFONAMIDOACETIC ACID UNLABELED (MIX OF ISOMERS) 50 UG/ML IN METHANOL	
LC50 fish 1	15400 mg/l mortality LC50 - Lepomis machrochirus (Bluegill) - 96 h
EC50 Daphnia 1	> 10000 mg/l Daphnia magna (Water flea) - 48 h
EC50 Daphnia 2	22000 mg/l Growth inhibition EC50 - Scenedesmus capricornutum (fresh water algae) - 96 h
NOEC (acute)	7900 mg/l Oryzias latipes - 200 h

100% METHANOL UNLABELED (67-56-1)	
LC50 fish 1	15400 mg/l mortality LC50 - Lepomis machrochirus (Bluegill) - 96 h
EC50 Daphnia 1	> 10000 mg/l Daphnia magna (Water flea) - 48 h
EC50 Daphnia 2	22000 mg/l Growth inhibition EC50 - Scenedesmus capricornutum (fresh water algae) - 96 h
NOEC (acute)	7900 mg/l Oryzias latipes - 200 h

12.2. Persistence and degradability

N-METHYLPERFLUOROOCTANESULFONAMIDOACETIC ACID UNLABELED (MIX OF ISOMERS) 50 UG/ML IN METHANOL	
Biochemical oxygen demand (BOD)	600 - 1200 mg/g
Chemical oxygen demand (COD)	1420 mg/g
ThOD	1500 mg/g
Biodegradation	72 % - rapidly biodegradable aerobic - Exposure time 5 d

100% METHANOL UNLABELED (67-56-1)	
Biochemical oxygen demand (BOD)	600 - 1200 mg/g
Chemical oxygen demand (COD)	1420 mg/g
ThOD	1500 mg/g
Biodegradation	72 % - rapidly biodegradable aerobic - Exposure time 5 d

12.3. Bioaccumulative potential

N-METHYLPERFLUOROOCTANESULFONAMIDOACETIC ACID UNLABELED (MIX OF ISOMERS) 50 UG/ML IN METHANOL	
BCF fish 1	5 mg/l Cyprinus carpio (Carp) - 72 d at 20 °C
Bioconcentration factor (BCF REACH)	1
Log Pow	-0.77

100% METHANOL UNLABELED (67-56-1)	
BCF fish 1	5 mg/l Cyprinus carpio (Carp) - 72 d at 20 °C
Bioconcentration factor (BCF REACH)	1
Log Pow	-0.77

12.4. Mobility in soil

N-METHYLPERFLUOROOCTANESULFONAMIDOACETIC ACID UNLABELED (MIX OF ISOMERS) 50 UG/ML IN METHANOL	
Ecology - soil	Not degradable in the soil.

100% METHANOL UNLABELED (67-56-1)	
Ecology - soil	Not degradable in the soil.

12.5. Results of PBT and vPvB assessment

N-METHYLPERFLUOROOCTANESULFONAMIDOACETIC ACID UNLABELED (MIX OF ISOMERS) 50 UG/ML IN METHANOL
PBT: not relevant – no registration required

100% METHANOL UNLABELED (67-56-1)
PBT: not relevant – no registration required

12.6. Other adverse effects

Other adverse effects : Avoid release to the environment.

Other information : Stability in water: at 19 °C - (83 - 91%) - 72 h. Remarks: Hydrolyses on contact with water. Hydrolyses readily.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Regional legislation (waste) : Waste materials should be disposed of under conditions which meet Federal, State, and local environmental control regulations.

Product/Packaging disposal recommendations : Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Ecology - waste materials : Dispose of as unused product.

SECTION 14: Transport information

In accordance with ADR / RID / IMDG / IATA / ADN

14.1. UN number

UN-No.(DOT) : 1230

DOT NA no. UN1230

14.2. UN proper shipping name

Proper Shipping Name (DOT) : Methanol

Class (DOT) : 3 - Class 3 - Flammable and combustible liquid 49 CFR 173.120

Hazard labels (DOT) : 3 - Flammable liquid
6.1 - Poison

DOT Symbols : + - Fixes (cannot be altered) proper shipping name, hazard class, and packing group,I - Proper shipping name appropriate for international and domestic transportation

Packing group (DOT) : II - Medium Danger

DOT Special Provisions (49 CFR 172.102) : IB2 - Authorized IBCs: Metal (31A, 31B and 31N); Rigid plastics (31H1 and 31H2); Composite (31HZ1). Additional Requirement: Only liquids with a vapor pressure less than or equal to 110 kPa at 50 C (1.1 bar at 122 F), or 130 kPa at 55 C (1.3 bar at 131 F) are authorized.
T7 - 4 178.274(d)(2) Normal..... 178.275(d)(3)
TP2 - a. The maximum degree of filling must not exceed the degree of filling determined by the following: (image) Where: tr is the maximum mean bulk temperature during transport, tf is the temperature in degrees celsius of the liquid during filling, and a is the mean coefficient of cubical expansion of the liquid between the mean temperature of the liquid during filling (tf) and the maximum mean bulk temperature during transportation (tr) both in degrees celsius. b. For liquids transported under ambient conditions may be calculated using the formula: (image) Where: d15 and d50 are the densities (in units of mass per unit volume) of the liquid at 15 C (59 F) and 50 C (122 F), respectively.

DOT Packaging Exceptions (49 CFR 173.xxx) : 150

DOT Packaging Non Bulk (49 CFR 173.xxx) : 202

DOT Packaging Bulk (49 CFR 173.xxx) : 242

DOT RQ : 5000 lbs

Marine pollutant : No

14.3. Additional information

Emergency Response Guide (ERG) Number : 131

Other information : No supplementary information available.

Overland transport

Packing group (ADR) : II

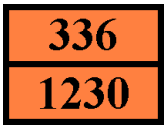
Class (ADR) : 3 - Flammable liquid

Hazard identification number (Kemler No.) : 336

Classification code (ADR) : FT1

Hazard labels (ADR) : 3 - Flammable liquids
6.1 - Toxic substances

Orange plates :



Tunnel restriction code (ADR)	:	D/E
Limited quantities (ADR)		1l
Excepted quantities (ADR)	:	E2

Transport by sea

DOT Vessel Stowage Location	:	B - (i) The material may be stowed ‘‘on deck’’ or ‘‘under deck’’ on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers, or one passenger per each 3 m of overall vessel length; and (ii) ‘‘On deck only’’ on passenger vessels in which the number of passengers specified in paragraph (k)(2)(i) of this section is exceeded.
DOT Vessel Stowage Other	:	40 - Stow ‘‘clear of living quarters’’
MFAG-No	:	131

Air transport

DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27)	:	1 L
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75)	:	60 L
Civil Aeronautics Law	:	Flammable liquids

14.4. Environmental hazards

Other information : No supplementary information available.

14.5. Special precautions for user

14.6. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable

SECTION 15: Regulatory information

15.1. US Federal regulations

N-METHYLPERFLUOROOCTANESULFONAMIDOACETIC ACID UNLABELED (MIX OF ISOMERS) 50 UG/ML IN METHANOL	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
CERCLA RQ	5000 lb
SARA Section 302 Threshold Planning Quantity (TPQ)	Not subject to reporting requirements of the United States SARA Section 302.
SARA Section 311/312 Hazard Classes	Fire hazard Immediate (acute) health hazard Delayed (chronic) health hazard
SARA Section 313 - Emission Reporting	Subject to reporting requirements of United States SARA Section 313

N-METHYLPERFLUOROOCTANESULFONAMIDOACETIC ACID UNLABELED - (2355-31-9)	
SARA Section 302 Threshold Planning Quantity (TPQ)	Not subject to reporting requirements of the United States SARA Section 302.
SARA Section 313 - Emission Reporting	Not subject to reporting requirements of the United States SARA Section 313.

100% METHANOL UNLABELED (67-56-1)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
CERCLA RQ	5000 lb
SARA Section 302 Threshold Planning Quantity (TPQ)	Not subject to reporting requirements of the United States SARA Section 302.
SARA Section 311/312 Hazard Classes	Fire hazard Immediate (acute) health hazard Delayed (chronic) health hazard
SARA Section 313 - Emission Reporting	Subject to reporting requirements of United States SARA Section 313

15.2. International regulations

CANADA

N-METHYLPERFLUOROOCTANESULFONAMIDOACETIC ACID UNLABELED (MIX OF ISOMERS) 50 UG/ML IN METHANOL
Listed on the Canadian DSL (Domestic Substances List)

100% METHANOL UNLABELED (67-56-1)
Listed on the Canadian DSL (Domestic Substances List)

15.2.1. National regulations

No additional information available

15.3. US State regulations

N-METHYLPERFLUOROOCTANESULFONAMIDOACETIC ACID UNLABELED (MIX OF ISOMERS) 50 UG/ML IN METHANOL**()**	
U.S. - California - Proposition 65 - Carcinogens List	No
U.S. - California - Proposition 65 - Developmental Toxicity	Yes
U.S. - California - Proposition 65 - Reproductive Toxicity - Female	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No
State or local regulations	U.S. - Delaware - Pollutant Discharge Requirements - Reportable Quantities U.S. - Idaho - Non-Carcinogenic Toxic Air Pollutants - Acceptable Ambient Concentrations U.S. - Massachusetts - Right To Know List U.S. - Pennsylvania - RTK (Right to Know) List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - New York - Reporting of Releases Part 597 - List of Hazardous Substances

N-METHYLPERFLUOROOCTANESULFONAMIDOACETIC ACID UNLABELED - (2355-31-9)				
U.S. - California - Proposition 65 - Carcinogens List	U.S. - California - Proposition 65 - Developmental Toxicity	U.S. - California - Proposition 65 - Reproductive Toxicity - Female	U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No significant risk level (NSRL)
No	No	No	No	

100% METHANOL UNLABELED (67-56-1)				
U.S. - California - Proposition 65 - Carcinogens List	U.S. - California - Proposition 65 - Developmental Toxicity	U.S. - California - Proposition 65 - Reproductive Toxicity - Female	U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No significant risk level (NSRL)
No	Yes	No	No	

N-METHYLPERFLUOROOCTANESULFONAMIDOACETIC ACID UNLABELED - (2355-31-9)
State or local regulations
U.S. - Pennsylvania - RTK (Right to Know) List U.S. - New Jersey - Right to Know Hazardous Substance List

100% METHANOL UNLABELED (67-56-1)
State or local regulations
U.S. - Delaware - Pollutant Discharge Requirements - Reportable Quantities U.S. - Idaho - Non-Carcinogenic Toxic Air Pollutants - Acceptable Ambient Concentrations U.S. - Massachusetts - Right To Know List U.S. - Pennsylvania - RTK (Right to Know) List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - New York - Reporting of Releases Part 597 - List of Hazardous Substances

SECTION 16: Other information

Other information : This product is not radioactive. The data given for this product are those of the corresponding unlabeled compound, unless specifically indicated otherwise. Health and safety data for labeled compounds are generally not available, but are assumed to be similar or identical to the corresponding unlabeled compound.

Full text of R-, H- and EUH-phrases:

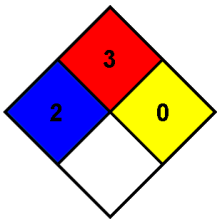
Acute Tox. 3 (Dermal)	Acute toxicity (dermal) Category 3
Acute Tox. 3 (Inhalation:vapour)	Acute toxicity (inhalation:vapour) Category 3
Acute Tox. 3 (Oral)	Acute toxicity (oral) Category 3
Eye Irrit. 2	Serious eye damage/eye irritation Category 2
Flam. Liq. 2	Flammable liquids Category 2
Skin Irrit. 2	Skin corrosion/irritation Category 2
STOT SE 1	Specific target organ toxicity (single exposure) Category 1
STOT SE 3	Specific target organ toxicity (single exposure) Category 3
H225	Highly flammable liquid and vapour
H301	Toxic if swallowed

H311	Toxic in contact with skin
H315	Causes skin irritation
H319	Causes serious eye irritation
H331	Toxic if inhaled
H335	May cause respiratory irritation
H370	Causes damage to organs
R11	Highly flammable
R36/37/38	Irritating to eyes, respiratory system and skin
R36/38	Irritating to eyes and skin
R39/23/24/25	Toxic: danger of very serious irreversible effects through inhalation, in contact with skin and if swallowed
F	Highly flammable
T	Toxic
Xi	Irritant

NFPA health hazard : 2 - Materials that, under emergency conditions, can cause temporary incapacitation or residual injury.

NFPA fire hazard : 3 - Liquids and solids (including finely divided suspended solids) that can be ignited under almost all ambient temperature conditions.

NFPA reactivity : 0 - Material that in themselves are normally stable, even under fire conditions.



Hazard Rating

Health : 2 Moderate Hazard - Temporary or minor injury may occur

Flammability : 3 Serious Hazard

Physical : 0 Minimal Hazard

CIL Mixture SDS

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product

SAFETY DATA SHEET

Version 4.7
Revision Date 01/03/2015
Print Date 05/28/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : 2,4,5-Trichlorophenol

Product Number : 156515
Brand : Aldrich
Index-No. : 604-017-00-X

CAS-No. : 95-95-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 4), H302
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)
H302 Harmful if swallowed.
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P273 Avoid release to the environment.
P280 Wear eye protection/ face protection.

P280	Wear protective gloves.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell. Rinse mouth.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P391	Collect spillage.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	$C_6H_3Cl_3O$
Molecular weight	:	197.45 g/mol
CAS-No.	:	95-95-4
EC-No.	:	202-467-8
Index-No.	:	604-017-00-X

Hazardous components

Component	Classification	Concentration
2,4,5-Trichlorophenol		
	Acute Tox. 4; Skin Irrit. 2; Eye Irrit. 2A; Aquatic Acute 1; Aquatic Chronic 1; H302, H315, H319, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

Keep in a dry place.
Storage class (TRGS 510): Non Combustible Solids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator.For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder Colour: beige
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 67 - 69 °C (153 - 156 °F) - lit.
f)	Initial boiling point and boiling range	248 °C (478 °F) at 987 hPa (740 mmHg) - lit.
g)	Flash point	133.0 °C (271.4 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available

p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 820.0 mg/kg

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC:	2B - Group 2B: Possibly carcinogenic to humans (2,4,5-Trichlorophenol)
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a

carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: SN1400000

Depending on the intensity and duration of exposure, effects may vary from mild irritation to severe destruction of tissue., Damage to the lungs., Liver injury may occur., Kidney injury may occur., Damage to the eyes.

Eyes -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 0.274 mg/l - 96.0 h
	NOEC - Cyprinodon variegatus (sheepshead minnow) - 1 mg/l - 96.0 h
Toxicity to daphnia and other aquatic invertebrates	Immobilization EC50 - Daphnia magna (Water flea) - 0.9 mg/l - 48 h

12.2 Persistence and degradability

12.3 Bioaccumulative potential

Bioaccumulation	Pimephales promelas (fathead minnow) - 28 d - 0.0048 mg/l
	Bioconcentration factor (BCF): 1,900

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (2,4,5-Trichlorophenol)

Reportable Quantity (RQ): 10 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (2,4,5-Trichlorophenol)
Marine pollutant:yes
IATA
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (2,4,5-Trichlorophenol)

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
2,4,5-Trichlorophenol	95-95-4	2011-07-01

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
2,4,5-Trichlorophenol	95-95-4	2011-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
2,4,5-Trichlorophenol	95-95-4	2011-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
2,4,5-Trichlorophenol	95-95-4	2011-07-01

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Eye Irrit.	Eye irritation
H302	Harmful if swallowed.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H400	Very toxic to aquatic life.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	1
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	1
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.7 Revision Date: 01/03/2015 Print Date: 05/28/2016

SAFETY DATA SHEET

Version 6.10
Revision Date 09/06/2024
Print Date 09/07/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : 2-Butanone

Product Number : 360473
Brand : SIGALD
Index-No. : 606-002-00-3
CAS-No. : 78-93-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquids (Category 2), H225
Eye irritation (Category 2A), H319
Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336

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For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal Word: Danger

Hazard Statements

H225	Highly flammable liquid and vapor.
H319	Causes serious eye irritation.
H336	May cause drowsiness or dizziness.

Precautionary Statements

P210	Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P261	Avoid breathing mist or vapors.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/ eye protection/ face protection.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Repeated exposure may cause skin dryness or cracking.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Methyl ethyl ketone MEK Ethyl methyl ketone
Formula	:	C_4H_8O

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Molecular weight	:	72.11 g/mol
CAS-No.	:	78-93-3
EC-No.	:	201-159-0
Index-No.	:	606-002-00-3

Component	Classification	Concentration
Ethyl Methyl Ketone		
	Flam. Liq. 2; Eye Irrit. 2A; STOT SE 3; H225, H319, H336 Concentration limits: 20 %: STOT SE 3, H336;	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Call in physician.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

In case of eye contact
After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

If swallowed
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Water Foam Carbon dioxide (CO2) Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

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5.2 Special hazards arising from the substance or mixture

Carbon oxides
Combustible.
Pay attention to flashback.
Vapors are heavier than air and may spread along floors.
Development of hazardous combustion gases or vapours possible in the event of fire.
Forms explosive mixtures with air at ambient temperatures.

5.3 Advice for firefighters

In the event of fire, wear self-contained breathing apparatus.

5.4 Further information

Remove container from danger zone and cool with water. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition.
Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains. Risk of explosion.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up with liquid-absorbent material (e.g. Chemizorb®).
Dispose of properly. Clean up affected area.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

Advice on protection against fire and explosion
Keep away from open flames, hot surfaces and sources of ignition.Take precautionary measures against static discharge.

Hygiene measures
Change contaminated clothing. Preventive skin protection recommended. Wash hands after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Store under inert gas.

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Keep container tightly closed in a dry and well-ventilated place. Keep away from heat and sources of ignition.

Hygroscopic. Store under nitrogen.

Storage class
Storage class (TRGS 510): 3: Flammable liquids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Ethyl Methyl Ketone	78-93-3	TWA	75 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Danger of cutaneous absorption		
		STEL	150 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Danger of cutaneous absorption		
		TWA	200 ppm 590 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	300 ppm 885 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	200 ppm 590 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		PEL	200 ppm 590 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		STEL	300 ppm 885 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Ethyl Methyl Ketone	78-93-3	methyl ethyl ketone	2 mg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift (As soon as possible after exposure ceases)			

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8.2 Exposure controls

Appropriate engineering controls

Change contaminated clothing. Preventive skin protection recommended. Wash hands after working with substance.

Personal protective equipment

Eye/face protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Splash contact
Material: butyl-rubber
Minimum layer thickness: 0.7 mm
Break through time: 240 min
Material tested:Butoject® (KCL 898)

Body Protection

Flame retardant antistatic protective clothing.

Respiratory protection

Recommended Filter type: Filter A (acc. to DIN 3181) for vapours of organic compounds
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when vapours/aerosols are generated. Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure

Do not let product enter drains. Risk of explosion.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid, clear Color: colorless
b)	Odor	No data available
c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point: -87 °C (-125 °F)

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f)	Initial boiling point and boiling range	80 °C 176 °F - lit.
g)	Flash point	-1 °C (30 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 10.1 %(V) Lower explosion limit: 1.8 %(V)
k)	Vapor pressure	95 hPa at 20 °C (68 °F)
l)	Vapor density	2.49 - (Air = 1.0)
m)	Density	0.805 g/mL at 25 °C (77 °F) - lit.
	Relative density	No data available
n)	Water solubility	soluble
o)	Partition coefficient: n-octanol/water	log Pow: 0.3 at 40 °C (104 °F) - Bioaccumulation is not expected.
p)	Autoignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	none

9.2 Other safety information

Surface tension	24.6 mN/m at 20 °C (68 °F)
Relative vapor density	2.49 - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity

Vapors may form explosive mixture with air.

10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions

Risk of ignition or formation of inflammable gases or vapours with:
Exothermic reaction with:
Oxidizing agents
alkali hydroxides
chromium(VI) oxide

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Risk of explosion with:
hydrogen peroxide
Nitric acid
conc. sulfuric acid

10.4 Conditions to avoid
Exposure to moisture.
Warming.

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - male and female - 2,193 mg/kg
(OECD Test Guideline 423)
LC50 Inhalation - Mouse - 4 h - 32,000 mg/m3 - vapor

Remarks: (RTECS)
LD50 Dermal - Rabbit - 6,480 mg/kg
Remarks: (RTECS)
No data available

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation - 4 h
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Severe irritations
(OECD Test Guideline 405)
Remarks: (Regulation (EC) No 1272/2008, Annex VI)

Respiratory or skin sensitization
Buehler Test - Guinea pig
Result: negative
(OECD Test Guideline 406)

Germ cell mutagenicity
Test Type: Ames test
Test system: S. typhimurium
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative
Test Type: Mutagenicity (mammal cell test): chromosome aberration.
Test system: rat hepatocytes

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Method: OECD Test Guideline 473
Result: negative
Test Type: In vitro mammalian cell gene mutation test
Test system: mouse lymphoma cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
Result: negative

Test Type: Micronucleus test
Species: Mouse
Cell type: Bone marrow
Application Route: Intraperitoneal
Method: OECD Test Guideline 474
Result: negative

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
May cause drowsiness or dizziness.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

RTECS: EL6475000
Central nervous system depression, Gastrointestinal disturbance, narcosis
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Liver - Irregularities - Based on Human Evidence

Liver - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	static test LC50 - Pimephales promelas (fathead minnow) - 2,993 mg/l - 96 h

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	(OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	static test EC50 - Daphnia magna (Water flea) - 308 mg/l - 48 h (OECD Test Guideline 202)
Toxicity to algae	static test ErC50 - Pseudokirchneriella subcapitata - 1,972 mg/l - 72 h (OECD Test Guideline 201)

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 28 d Result: 98 % - Readily biodegradable. (OECD Test Guideline 301D)
Theoretical oxygen demand	2,440 mg/g Remarks: (Lit.)
Ratio BOD/ThBOD	76 % Remarks: (IUCLID)

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties

No data available

12.7 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)

UN number: 1193 Class: 3 Packing group: II

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Proper shipping name: Ethyl methyl ketone
Reportable Quantity (RQ): 5000 lbs
Reportable Quantity (RQ): 5000 lbs
Reportable Quantity (RQ): 100 lbs
Poison Inhalation Hazard: No

IMDG
UN number: 1193 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: ETHYL METHYL KETONE

IATA
UN number: 1193 Class: 3 Packing group: II
Proper shipping name: Ethyl methyl ketone

SECTION 15: Regulatory information

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
Ethyl Methyl Ketone	78-93-3	5000	5000
Ethyl Methyl Ketone	78-93-3	5000	5000 (D035)
Ethyl Methyl Ketone	78-93-3	100	100 (F005)

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Fire Hazard
Acute Health Hazard
Chronic Health Hazard

SARA 313 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

US State Regulations

Massachusetts Right To Know
Ethyl Methyl Ketone 78-93-3

Pennsylvania Right To Know
Ethyl Methyl Ketone 78-93-3

Maine Chemicals of High Concern
Product does not contain any listed chemicals

Vermont Chemicals of High Concern
Ethyl Methyl Ketone 78-93-3

Washington Chemicals of High Concern

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Ethyl Methyl Ketone 78-93-3

The ingredients of this product are reported in the following inventories:

TSCA : All substances listed as active on the TSCA inventory

TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 6.10 Revision Date: 09/06/2024 Print Date: 09/07/2024

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Fisher Scientific

Part of Thermo Fisher Scientific

SAFETY DATA SHEET

Revision Date 10-Feb-2015 **Revision Number** 1

1. Identification

Product Name **2-Methylnaphthalene, 99% (gc)**

Cat No. : **AC414551000; AC414555000**

Synonyms No information available

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Entity / Business Name
Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute oral toxicity	Category 4
Skin Corrosion/irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system.	

Label Elements

Signal Word
Warning

Hazard Statements
Harmful if swallowed
Causes skin irritation
Causes serious eye irritation
May cause respiratory irritation

Precautionary Statements
Prevention
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Wear protective gloves/protective clothing/eye protection/face protection
Avoid breathing dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor/physician if you feel unwell
Skin
IF ON SKIN: Wash with plenty of soap and water
If skin irritation occurs: Get medical advice/attention
Take off contaminated clothing and wash before reuse
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
Ingestion
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
Rinse mouth
Storage
Store in a well-ventilated place. Keep container tightly closed
Store locked up
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Toxic to aquatic life with long lasting effects

3. Composition / information on ingredients

Component	CAS-No	Weight %
2-Methylnaphthalene	91-57-6	99.0

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes.

Inhalation Move to fresh air.

Ingestion Do not induce vomiting.

Most important symptoms/effects No information available.
Notes to Physician Treat symptomatically

5. Fire-fighting measures

Unsuitable Extinguishing Media No information available

Flash Point
Method - No information available

Autoignition Temperature No information available
Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products
None known
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
2	1	0	N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment.
Environmental Precautions See Section 12 for additional ecological information. Avoid release to the environment. Collect spillage.

Methods for Containment and Clean Up No information available.

7. Handling and storage

Handling Ensure adequate ventilation.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH
2-Methylnaphthalene	TWA: 0.5 ppm Skin		

Component	Quebec	Mexico OEL (TWA)	Ontario TWAEV
2-Methylnaphthalene			TWA: 0.5 ppm Skin

Legend

ACGIH - American Conference of Governmental Industrial Hygienists

Engineering Measures Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Solid
Appearance	No information available
Odor	Odorless
Odor Threshold	No information available
pH	
Melting Point/Range	37 38 °C
Boiling Point/Range	°C
Flash Point	
Evaporation Rate	No information available
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	< 1 mmHg @ 25 °C
Vapor Density	No information available
Relative Density	1.0000
Solubility	Insoluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	C11H10
Molecular Weight	142.20

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products.

Incompatible Materials Strong oxidizing agents

Hazardous Decomposition Products None under normal use conditions

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
2-Methylnaphthalene	1630 mg/kg (Rat)	Not listed	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
2-Methylnaphthalene	91-57-6	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system
STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity
Do not empty into drains.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
2-Methylnaphthalene	Not listed	Pimephales promelas:LC50 = 2.5mg/L	Not listed	EC50 = 1.5 mg/L/48h

Persistence and Degradability No information available
Bioaccumulation/ Accumulation No information available.

Mobility No information available.

Component	log Pow
2-Methylnaphthalene	3.86

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT Not regulated
TDG Not regulated
IATA Not regulated
IMDG/IMO Not regulated

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
2-Methylnaphthalene	X	X	-	202-078-3	-		X	X	X	X	-

Legend:

X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313 Not applicable

SARA 311/312 Hazardous Categorization

Acute Health Hazard	Yes
Chronic Health Hazard	No
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act Not applicable

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA
Not applicable

California Proposition 65 This product does not contain any Proposition 65 chemicals

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
2-Methylnaphthalene	-	X	-	-	-

U.S. Department of Transportation

Reportable Quantity (RQ):	N
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class D1B Toxic materials

D2B Toxic materials

16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Revision Date 10-Feb-2015
Print Date 10-Feb-2015
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer

The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS

SAFETY DATA SHEET

Version 5.1
Revision Date 06/26/2014
Print Date 05/11/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : 4,4′-DDD

Product Number : 35486
Brand : Sigma-Aldrich

CAS-No. : 72-54-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 3), H301
Acute toxicity, Dermal (Category 4), H312
Carcinogenicity (Category 2), H351
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H301 Toxic if swallowed.
H312 Harmful in contact with skin.
H351 Suspected of causing cancer.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.

P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P322	Specific measures (see supplemental first aid instructions on this label).
P330	Rinse mouth.
P363	Wash contaminated clothing before reuse.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	1,1-Dichloro-2,2-bis(4-chlorophenyl)ethane TDE
Formula	:	$C_{14}H_{10}Cl_4$
Molecular Weight	:	320.04 g/mol
CAS-No.	:	72-54-8
EC-No.	:	200-783-0

Hazardous components

Component	Classification	Concentration
2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane		
	Acute Tox. 3; Acute Tox. 4; Carc. 2; Aquatic Acute 1; Aquatic Chronic 1; H301, H312, H351, H410	-

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
no data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides, Hydrogen chloride gas
Nature of decomposition products not known.

5.3 Advice for firefighters

Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information

no data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.Normal measures for preventive fire protection.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odour	no data available
c)	Odour Threshold	no data available
d)	pH	no data available
e)	Melting point/freezing point	94.0 - 96.0 °C (201.2 - 204.8 °F)
f)	Initial boiling point and boiling range	193.0 °C (379.4 °F) at 1.3 hPa (1.0 mmHg)
g)	Flash point	no data available
h)	Evapouration rate	no data available
i)	Flammability (solid, gas)	no data available
j)	Upper/lower flammability or explosive limits	no data available
k)	Vapour pressure	< 0.00001 hPa (< 0.00001 mmHg) at 25.0 °C (77.0 °F)
l)	Vapour density	no data available
m)	Relative density	1.38 g/cm3
n)	Water solubility	no data available
o)	Partition coefficient: n-octanol/water	log Pow: 6.02
p)	Auto-ignition temperature	no data available
q)	Decomposition temperature	no data available
r)	Viscosity	no data available
s)	Explosive properties	no data available
t)	Oxidizing properties	no data available

9.2 Other safety information
no data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
no data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
no data available

10.4 Conditions to avoid
no data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - no data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Hamster - > 5,000 mg/kg

TDLo Oral - Human - 428.5 mg/kg
Remarks: Endocrine:Adrenal cortex hypoplasia.

TDLo Oral - rat - 6,000 mg/kg
Remarks: Cardiac:Other changes. Gastrointestinal:Other changes. Kidney, Ureter, Bladder:Changes in both tubules and glomeruli.

TDLo Oral - rat - 14 mg/kg
Remarks: Liver:Changes in liver weight. Endocrine:Estrogenic. Musculoskeletal:Other changes.

TDLo Oral - rat - 2,100 mg/kg
Remarks: Behavioral:Altered sleep time (including change in righting reflex).

Inhalation: no data available

LD50 Dermal - rabbit - 1,200 mg/kg
Remarks: Behavioral:Excitement. Behavioral:Convulsions or effect on seizure threshold. Skin irritation

no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitisation
no data available

Germ cell mutagenicity
no data available

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Limited evidence of carcinogenicity in animal studies

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as

probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
no data available

no data available

Specific target organ toxicity - single exposure
no data available

Specific target organ toxicity - repeated exposure
no data available

Aspiration hazard
no data available

Additional Information
RTECS: KI0700000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - other fish - 1.18 - 9 mg/l - 96.0 h
	LC50 - Lepomis macrochirus (Bluegill) - 0.04 - 0.05 mg/l - 96.0 h
	LC50 - Oncorhynchus mykiss (rainbow trout) - 0.06 - 0.09 mg/l - 96.0 h
	LC50 - Pimephales promelas (fathead minnow) - 3.47 - 5.58 mg/l - 96.0 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia pulex (Water flea) - 0.01 mg/l - 48 h

12.2 Persistence and degradability
no data available

12.3 Bioaccumulative potential
Indication of bioaccumulation.

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 2811 Class: 6.1 Packing group: III
Proper shipping name: Toxic solids, organic, n.o.s. (2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane)
Reportable Quantity (RQ): 1 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN number: 2811 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. (2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane)
Marine pollutant: No

IATA
UN number: 2811 Class: 6.1 Packing group: III
Proper shipping name: Toxic solid, organic, n.o.s. (2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane)

15. REGULATORY INFORMATION

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Acute Health Hazard

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane	72-54-8	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane	72-54-8	1993-04-24

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No.	Revision Date
2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane	72-54-8	2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
H301	Toxic if swallowed.
H312	Harmful in contact with skin.
H351	Suspected of causing cancer.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.1 Revision Date: 06/26/2014 Print Date: 05/11/2016

SAFETY DATA SHEET

Revision Date 10-Feb-2015 **Revision Number** 1

1. Identification

Product Name **p-Cymene**

Cat No. : **AC111760000; AC111760010; AC111760025; AC111760100; AC111762500**

Synonyms Dolcymene; p-Isopropyltoluene

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Entity / Business Name
Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable liquids	Category 3
Skin Corrosion/irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system.	
Aspiration Toxicity	Category 1

Label Elements

Signal Word
Danger

Hazard Statements
Flammable liquid and vapor
May be fatal if swallowed and enters airways
Causes skin irritation
Causes serious eye irritation
May cause respiratory irritation

Precautionary Statements
Prevention
Wash face, hands and any exposed skin thoroughly after handling
Wear protective gloves/protective clothing/eye protection/face protection
Avoid breathing dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Keep container tightly closed
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting/equipment
Use only non-sparking tools
Take precautionary measures against static discharge
Keep cool
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor/physician if you feel unwell
Skin
If skin irritation occurs: Get medical advice/attention
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
Wash contaminated clothing before reuse
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
Ingestion
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
Do NOT induce vomiting
Fire
In case of fire: Use CO2, dry chemical, or foam for extinction
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
None identified

3. Composition / information on ingredients

Component	CAS-No	Weight %
p-Cymene	99-87-6	>95

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.

Skin Contact Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Obtain medical attention.

Inhalation Remove from exposure, lie down. Move to fresh air. If breathing is difficult, give oxygen. If

not breathing, give artificial respiration. Obtain medical attention.

Ingestion Do not induce vomiting. Clean mouth with water. Get medical attention.

Most important symptoms/effects Breathing difficulties. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Water spray. Carbon dioxide (CO_2). Dry chemical. Use water spray to cool unopened containers. chemical foam.

Unsuitable Extinguishing Media No information available

Flash Point 47 °C / 116.6 °F
Method - No information available

Autoignition Temperature 435 °C / 815 °F
Explosion Limits
Upper 5.60%
Lower .70%
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Flammable. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Containers may explode when heated.

Hazardous Combustion Products
Carbon monoxide (CO) Carbon dioxide (CO_2)
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
3	2	0	N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment.
Environmental Precautions See Section 12 for additional ecological information.

Methods for Containment and Clean Up Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Keep in suitable, closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.

7. Handling and storage

Handling Avoid contact with skin and eyes. Do not breathe dust. Do not breathe vapors or spray mist. Take precautionary measures against static discharges. Use explosion-proof equipment. Use only non-sparking tools.

Storage Keep in a dry, cool and well-ventilated place. Keep container tightly closed. Keep away from heat and sources of ignition. Flammables area.

8. Exposure controls / personal protection

Exposure Guidelines This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Engineering Measures Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Clear
Odor	aromatic
Odor Threshold	No information available
pH	No information available
Melting Point/Range	-68 °C / -90.4 °F
Boiling Point/Range	176 - 178 °C / 348.8 - 352.4 °F @ 760 mmHg
Flash Point	47 °C / 116.6 °F
Evaporation Rate	No information available
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	5.60%
Lower	.70%
Vapor Pressure	1.5 mmHg @ 20 °C
Vapor Density	4.62 (Air = 1.0)
Relative Density	0.854
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	435 °C / 815 °F
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	C10 H14
Molecular Weight	134.22

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Keep away from open flames, hot surfaces and sources of ignition. Excess heat. Incompatible products.

Incompatible Materials Strong oxidizing agents, Strong acids, Strong bases

Hazardous Decomposition Products Carbon monoxide (CO), Carbon dioxide (CO_2)

Hazardous Polymerization No information available.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
p-Cymene	3669 mg/kg (Rat)	Not listed	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
p-Cymene	99-87-6	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects Not mutagenic in AMES Test

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system

STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated. See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

Do not empty into drains.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
p-Cymene	Not listed	LC50: 48 mg/L/96h (sheepshead minnow)	Not listed	LC50: 6.5 mg/L/48h

Persistence and Degradability No information available

Bioaccumulation/ Accumulation No information available.

Mobility .

Component	log Pow
p-Cymene	4.1

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No	UN2046
Hazard Class	3
Packing Group	III

TDG

UN-No	UN2046
Hazard Class	3
Packing Group	III

IATA

UN-No	2046
Proper Shipping Name	CYMENES
Hazard Class	3
Packing Group	III

IMDG/IMO

UN-No	2046
Proper Shipping Name	CYMENES
Hazard Class	3
Packing Group	III

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
p-Cymene	X	X	-	202-796-7	-		X	X	X	X	X

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313 Not applicable

SARA 311/312 Hazardous Categorization

Acute Health Hazard	Yes
Chronic Health Hazard	No
Fire Hazard	Yes
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act Not applicable

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA
Not applicable

California Proposition 65 This product does not contain any Proposition 65 chemicals

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
p-Cymene	X	-	X	-	-

U.S. Department of Transportation

Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class B2 Flammable liquid
D2B Toxic materials

16. Other information

Prepared By Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Revision Date 10-Feb-2015
Print Date 10-Feb-2015
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer
The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS

SAFETY DATA SHEET

Creation Date 17-Sep-2009 **Revision Date** 20-Oct-2022 **Revision Number** 6

1. Identification

Product Name **4-Methyl-2-pentanone**

Cat No. : **AC127390000; AC127390010; AC127390025**

CAS No 108-10-1
Synonyms Isobutyl methyl ketone; Isopropylacetone; MIBK; Methyl isobutyl ketone

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company

Fisher Scientific Company
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable liquids	Category 2
Acute Inhalation Toxicity - Vapors	Category 4
Serious Eye Damage/Eye Irritation	Category 2
Carcinogenicity	Category 2
Specific target organ toxicity (single exposure)	Category 3

Target Organs - Respiratory system, Central nervous system (CNS).

Label Elements

Signal Word
Danger

Hazard Statements
Highly flammable liquid and vapor

Causes serious eye irritation
Harmful if inhaled
May cause drowsiness or dizziness
Suspected of causing cancer

Precautionary Statements
Prevention
Avoid breathing dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wash face, hands and any exposed skin thoroughly after handling
Wear eye/face protection
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Keep container tightly closed
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting equipment
Use only non-sparking tools
Take precautionary measures against static discharge
Keep cool
Response
IF exposed or concerned: Get medical attention/advice
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Skin
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
Fire
In case of fire: Use CO2, dry chemical, or foam for extinction
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Repeated exposure may cause skin dryness or cracking
WARNING. Cancer and Reproductive Harm - https://www.p65warnings.ca.gov/.

3. Composition/Information on Ingredients

Component	CAS No	Weight %
Methylisobutyl ketone	108-10-1	>95

4. First-aid measures

General Advice If symptoms persist, call a physician.

Eye Contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.
Skin Contact	Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.
Inhalation	Remove to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur.
Ingestion	Clean mouth with water and drink afterwards plenty of water.
Most important symptoms and effects	None reasonably foreseeable. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Water spray, carbon dioxide (CO2), dry chemical, alcohol-resistant foam. Water mist may be used to cool closed containers.
Unsuitable Extinguishing Media	No information available
Flash Point	14 °C / 57.2 °F
Method -	CC (closed cup)
Autoignition Temperature	460 °C / 860 °F
Explosion Limits	
Upper	8.0% @ 93°C
Lower	1.2% @ 93°C
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical
Flammable. Containers may explode when heated. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back.

Hazardous Combustion Products
Carbon monoxide (CO). Carbon dioxide (CO_2).
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
2	3	0	N/A

6. Accidental release measures

Personal Precautions	Ensure adequate ventilation. Use personal protective equipment as required. Remove all sources of ignition. Take precautionary measures against static discharges.
Environmental Precautions	Should not be released into the environment.
Methods for Containment and Clean Up	Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.

7. Handling and storage

Handling Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation. Ensure adequate ventilation. Keep away from open flames, hot surfaces and sources of ignition. Use only non-sparking tools. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded. Take precautionary measures against static discharges.

Storage. Keep containers tightly closed in a dry, cool and well-ventilated place. Flammables area. Keep away from heat, sparks and flame. Incompatible Materials. Strong oxidizing agents. Peroxides.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Methylisobutyl ketone	TWA: 20 ppm STEL: 75 ppm	(Vacated) TWA: 50 ppm (Vacated) TWA: 205 mg/m^3 (Vacated) STEL: 75 ppm (Vacated) STEL: 300 mg/m^3 TWA: 100 ppm TWA: 410 mg/m^3	IDLH: 500 ppm TWA: 50 ppm TWA: 205 mg/m^3 STEL: 75 ppm STEL: 300 mg/m^3	TWA: 20 ppm STEL: 75 ppm

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: NIOSH - National Institute for Occupational Safety and Health

Engineering Measures Use only under a chemical fume hood. Ensure that eyewash stations and safety showers are close to the workstation location. Use explosion-proof electrical/ventilating/lighting equipment. Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	Characteristic sweet
Odor Threshold	0.04 - 0.08 ppm
pH	No information available
Melting Point/Range	-84 °C / -119.2 °F
Boiling Point/Range	117.4 °C / 243.3 °F @ 760 mmHg
Flash Point	14 °C / 57.2 °F
Method -	CC (closed cup)
Evaporation Rate	1.6 (Butyl Acetate = 1.0)
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	8.0% @ 93°C

Lower	1.2% @ 93°C
Vapor Pressure	21.5 mbar @ 20 °C
Vapor Density	3.45 (Air = 1.0)
Specific Gravity	0.800
Solubility	Soluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	460 °C / 860 °F
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	C6 H12 O
Molecular Weight	100.16

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products. Heat, flames and sparks. Keep away from open flames, hot surfaces and sources of ignition.

Incompatible Materials Strong oxidizing agents, Peroxides

Hazardous Decomposition Products Carbon monoxide (CO), Carbon dioxide (CO_2)

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Methylisobutyl ketone	LD50 = 2080 mg/kg (Rat)	LD50 = 3000 mg/kg (Rabbit)	LC50 2000 - 4000 ppm (Rat) 4 h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Irritating to eyes and respiratory system

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
Methylisobutyl ketone	108-10-1	Group 2B	Not listed	A3	X	A3

IARC (International Agency for Research on Cancer)

ACGIH: (American Conference of Governmental Industrial Hygienists)

Mexico - Occupational Exposure Limits - Carcinogens

IARC (International Agency for Research on Cancer)
Group 1 - Carcinogenic to Humans
Group 2A - Probably Carcinogenic to Humans
Group 2B - Possibly Carcinogenic to Humans
A1 - Known Human Carcinogen
A2 - Suspected Human Carcinogen
A3 - Animal Carcinogen
ACGIH: (American Conference of Governmental Industrial Hygienists)
A1 - Confirmed Human Carcinogen
A2 - Suspected Human Carcinogen
A3 - Confirmed Animal Carcinogen
A4 - Not Classifiable as a Human Carcinogen

A5 - Not Suspected as a Human Carcinogen
Mexico - Occupational Exposure Limits - Carcinogens

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system Central nervous system (CNS)
STOT - repeated exposure None known

Aspiration hazard Category 1

Symptoms / effects,both acute and delayed Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity
Do not empty into drains. .

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Methylisobutyl ketone	EC50: 400 mg/L/96h	LC50: 496 - 514 mg/L, 96h flow-through (Pimephales promelas)	EC50 = 79.6 mg/L 5 min	EC50: 4280.0 mg/L/24h EC50: 170 mg/L/48h EC50: 4280.0 mg/L/24h

Persistence and Degradability Persistence is unlikely

Bioaccumulation/ Accumulation No information available.

Mobility . Will likely be mobile in the environment due to its water solubility.

Component	log Pow
Methylisobutyl ketone	1.9

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

Component	RCRA - U Series Wastes	RCRA - P Series Wastes
Methylisobutyl ketone - 108-10-1	U161	-

14. Transport information

DOT
UN-No UN1245
Proper Shipping Name METHYL ISOBUTYL KETONE
Hazard Class 3
Packing Group II

TDG
UN-No UN1245
Proper Shipping Name METHYL ISOBUTYL KETONE
Hazard Class 3
Packing Group II

IATA

UN-No	UN1245
Proper Shipping Name	METHYL ISOBUTYL KETONE
Hazard Class	3
Packing Group	II

IMDG/IMO

UN-No	UN1245
Proper Shipping Name	METHYL ISOBUTYL KETONE
Hazard Class	3
Packing Group	II

15. Regulatory information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	TSCA - EPA Regulatory Flags
Methylisobutyl ketone	108-10-1	X	ACTIVE	-

Legend:
TSCA US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA - Per 40 CFR 751, Regulation of Certain Chemical Substances & Mixtures, Under TSCA Section 6(h) (PBT) Not applicable

TSCA 12(b) - Notices of Export Not applicable

International Inventories
Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), China (IECSC), Korea (KECL).

Component	CAS No	DSL	NDSL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
Methylisobutyl ketone	108-10-1	X	-	203-550-1	X	X	X	X	X	KE-24725

KECL - NIER number or KE number (http://ncis.nier.go.kr/en/main.do)

U.S. Federal Regulations

SARA 313

Component	CAS No	Weight %	SARA 313 - Threshold Values %
Methylisobutyl ketone	108-10-1	>95	0.1

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act) Not applicable

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Methylisobutyl ketone	X		-

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Methylisobutyl ketone	5000 lb	-

California Proposition 65 This product contains the following Proposition 65 chemicals.

Component	CAS No	California Prop. 65	Prop 65 NSRL	Category
Methylisobutyl ketone	108-10-1	Carcinogen Developmental	-	Developmental Carcinogen

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Methylisobutyl ketone	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ): Y
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade Serious risk, Grade 3

Authorisation/Restrictions according to EU REACH

Component	CAS No	REACH (1907/2006) - Annex XIV - Substances Subject to Authorization	REACH (1907/2006) - Annex XVII - Restrictions on Certain Dangerous Substances	REACH Regulation (EC 1907/2006) article 59 - Candidate List of Substances of Very High Concern (SVHC)
Methylisobutyl ketone	108-10-1	-	Use restricted. See item 75. (see link for restriction details)	-

https://echa.europa.eu/substances-restricted-under-reach

Safety, health and environmental regulations/legislation specific for the substance or mixture

Component	CAS No	OECD HPV	Persistent Organic Pollutant	Ozone Depletion Potential	Restriction of Hazardous Substances (RoHS)
Methylisobutyl ketone	108-10-1	Listed	Not applicable	Not applicable	Not applicable

Component	CAS No	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)
Methylisobutyl ketone	108-10-1	Not applicable	Not applicable	Not applicable	Annex I - Y42

16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 17-Sep-2009

Revision Date	20-Oct-2022
Print Date	20-Oct-2022
Revision Summary	This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

SAFETY DATA SHEET

Version 5.4
Revision Date 01/02/2015
Print Date 12/11/2015

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Acenaphthene

Product Number : 215376
Brand : Aldrich

CAS-No. : 83-32-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Carcinogenicity (Category 1B), H350
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.
H350 May cause cancer.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.

P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear eye protection/ face protection.
P280	Wear protective gloves.
P281	Use personal protective equipment as required.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P312	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	1,8-Ethylenenaphthalene
Formula	:	$C_{12}H_{10}$
Molecular weight	:	154.21 g/mol
CAS-No.	:	83-32-9
EC-No.	:	201-469-6

Hazardous components

Component	Classification	Concentration
Acenaphthene		
	Skin Irrit. 2; Eye Irrit. 2A; Carc. 1B; STOT SE 3; Aquatic Acute 1; Aquatic Chronic 1; H315, H319, H335, H350, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.
Storage class (TRGS 510): Non Combustible Solids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator.For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 90 - 94 °C (194 - 201 °F) - lit.
f)	Initial boiling point and boiling range	279 °C (534 °F) - lit.
g)	Flash point	125.0 °C (257.0 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available

k)	Vapour pressure	13.3 hPa (10.0 mmHg) at 131.0 °C (267.8 °F)
l)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	log Pow: 3.39 - 4.19
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available

Inhalation: No data available

Dermal: No data available

LD50 Intraperitoneal - Rat - 600 mg/kg

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (Acenaphthene)

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: Reasonably anticipated to be a human carcinogen (Acenaphthene)

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
Inhalation - May cause respiratory irritation.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: AB1000000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 0.67 mg/l - 96.0 h
	LC50 - Pimephales promelas (fathead minnow) - 0.6 - 1.73 mg/l - 96.0 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 1.27 - 3.45 mg/l - 48 h
Toxicity to algae	EC50 - Pseudokirchneriella subcapitata (green algae) - 0.52 - 0.53 mg/l - 96 h

12.2 Persistence and degradability

12.3 Bioaccumulative potential

Bioaccumulation	Lepomis macrochirus (Bluegill) - 28 d - 0.00894 mg/l
	Bioconcentration factor (BCF): 387

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (Acenaphthene)
Reportable Quantity (RQ): 100 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Acenaphthene)
Marine pollutant:yes

IATA
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Acenaphthene)

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Acenaphthene	83-32-9	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Acenaphthene	83-32-9	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Acenaphthene	83-32-9	1993-04-24

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No.	Revision Date
Acenaphthene	83-32-9	2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
Eye Irrit.	Eye irritation
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.

H350	May cause cancer.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	0
Chronic Health Hazard:	*
Flammability:	1
Physical Hazard	0

NFPA Rating

Health hazard:	0
Fire Hazard:	1
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.4 Revision Date: 01/02/2015 Print Date: 12/11/2015

SAFETY DATA SHEET

Revision Date 10-Feb-2015 **Revision Number** 1

1. Identification

Product Name **Poly(acenaphthylene)**

Cat No. : **AC178020000; AC178020050; AC178020100**

Synonyms None.

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Entity / Business Name
Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
Classification under 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Based on available data, the classification criteria are not met

Label Elements
None required

Hazards not otherwise classified (HNOC)
None identified

Unknown Acute Toxicity
.? % of the mixture consists of ingredients of unknown toxicity.

3. Composition / information on ingredients

Component	CAS-No	Weight %
Poly(acenaphthylene)	25036-01-5	100

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.

Skin Contact Wash off immediately with soap and plenty of water while removing all contaminated

clothes and shoes.

Inhalation Remove from exposure, lie down. Move to fresh air.

Ingestion Do not induce vomiting. Never give anything by mouth to an unconscious person. Drink plenty of water. If possible drink milk afterwards.

Most important symptoms/effects No information available.
Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Water spray. Carbon dioxide (CO_2). Dry chemical. alcohol-resistant foam.

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature No information available
Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products
Thermal decomposition can lead to release of irritating gases and vapors Carbon monoxide (CO) Carbon dioxide (CO_2)
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health	Flammability	Instability	Physical hazards
0	0	0	N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment.
Environmental Precautions See Section 12 for additional ecological information.

Methods for Containment and Clean Up Sweep up or vacuum up spillage and collect in suitable container for disposal.

7. Handling and storage

Handling Avoid contact with skin and eyes. Avoid contact with clothing. Remove and wash contaminated clothing before re-use. Avoid breathing vapors or mists. Do not ingest. Wash thoroughly after handling.

Storage Keep in a dry, cool and well-ventilated place. Keep container tightly closed.

8. Exposure controls / personal protection

Exposure Guidelines This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Engineering Measures Ensure adequate ventilation, especially in confined areas. Ventilation systems.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Wear a NIOSH/MSHA or European Standard EN 149 approved full-facepiece airline respirator in the positive pressure mode with emergency escape provisions.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Powder Solid
Appearance	Yellow
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	No data available
Boiling Point/Range	No information available
Flash Point	No information available
Evaporation Rate	No information available
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	No information available
Relative Density	No information available
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products.

Incompatible Materials Oxidizing agents

Hazardous Decomposition Products Thermal decomposition can lead to release of irritating gases and vapors, Carbon monoxide (CO), Carbon dioxide (CO_2)

Hazardous Polymerization No information available.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information No acute toxicity information is available for this product

Oral LD50 Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.
Dermal LD50 Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.
Mist LC50 Based on ATE data, the classification criteria are not met. ATE > 5 mg/l.
Component Information
Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Poly(acenaphthylene)	25036-01-5	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known
STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available
Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity
Do not empty into drains.

Persistence and Degradability No information available
Bioaccumulation/ Accumulation No information available.

Mobility No information available.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT Not regulated
TDG Not regulated
IATA Not regulated
IMDG/IMO Not regulated

15. Regulatory information

International Inventories

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313 Not applicable

SARA 311/312 Hazardous Categorization

Acute Health Hazard	No
Chronic Health Hazard	No
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act Not applicable

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA
Not applicable

California Proposition 65 This product does not contain any Proposition 65 chemicals

State Right-to-Know Not applicable

U.S. Department of Transportation

Reportable Quantity (RQ):	N
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class Non-controlled

16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Revision Date 10-Feb-2015
Print Date 10-Feb-2015
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer

The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS

SAFETY DATA SHEET

Version 6.11
Revision Date 09/06/2024
Print Date 09/07/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Acetone

Product Number : 179124
Brand : SIGALD
Index-No. : 606-001-00-8
CAS-No. : 67-64-1

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquids (Category 2), H225
Eye irritation (Category 2A), H319
Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336

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For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal Word: Danger

Hazard Statements

H225	Highly flammable liquid and vapor.
H319	Causes serious eye irritation.
H336	May cause drowsiness or dizziness.

Precautionary Statements

P210	Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P261	Avoid breathing mist or vapors.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/ eye protection/ face protection.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Repeated exposure may cause skin dryness or cracking.

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	C_3H_6O
Molecular weight	:	58.08 g/mol
CAS-No.	:	67-64-1
EC-No.	:	200-662-2
Index-No.	:	606-001-00-8

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Component	Classification	Concentration
acetone		
	Flam. Liq. 2; Eye Irrit. 2A; STOT SE 3; H225, H319, H336 Concentration limits: >= 20 %: STOT SE 3, H336;	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Call in physician.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

In case of eye contact
After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

If swallowed
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Carbon dioxide (CO2) Foam Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

5.2 Special hazards arising from the substance or mixture

Carbon oxides
Combustible.
Pay attention to flashback.
Vapors are heavier than air and may spread along floors.
Development of hazardous combustion gases or vapours possible in the event of fire.
Forms explosive mixtures with air at ambient temperatures.

5.3 Advice for firefighters

In the event of fire, wear self-contained breathing apparatus.

5.4 Further information

Remove container from danger zone and cool with water. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition.
Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains. Risk of explosion.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up with liquid-absorbent material (e.g. Chemizorb®).
Dispose of properly. Clean up affected area.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

Advice on protection against fire and explosion
Keep away from open flames, hot surfaces and sources of ignition.Take precautionary measures against static discharge.

Hygiene measures
Change contaminated clothing. Preventive skin protection recommended. Wash hands after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions

The life science business of Merck KGaA, Darmstadt, Germany
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Keep container tightly closed in a dry and well-ventilated place. Keep away from heat and sources of ignition.

Storage class
Storage class (TRGS 510): 3: Flammable liquids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
acetone	67-64-1	TWA	250 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Not classifiable as a human carcinogen		
		STEL	500 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Not classifiable as a human carcinogen		
		TWA	250 ppm 590 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	1,000 ppm 2,400 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		C	3,000 ppm	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		PEL	500 ppm 1,200 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		STEL	750 ppm 1,780 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
acetone	67-64-1	Acetone	25 mg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift (As soon as possible after exposure ceases)			

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Derived No Effect Level (DNEL)

Application Area	Routes of exposure	Health effect	Value
Workers	Skin contact	Long-term systemic effects	186mg/kg BW/d
Consumers	Ingestion	Long-term systemic effects	62mg/kg BW/d
Consumers	Skin contact	Long-term systemic effects	62mg/kg BW/d
Workers	Inhalation	Acute systemic effects	2420 mg/m3
Workers	Inhalation	Long-term systemic effects	1210 mg/m3
Consumers	Inhalation	Long-term systemic effects	200 mg/m3

Predicted No Effect Concentration (PNEC)

Compartment	Value
Soil	33.3 mg/kg
Sea water	1.06 mg/l
Fresh water	10.6 mg/l
Sea sediment	3.04 mg/kg
Fresh water sediment	30.4 mg/kg
Onsite sewage treatment plant	100 mg/l

8.2 Exposure controls

Appropriate engineering controls
Change contaminated clothing. Preventive skin protection recommended. Wash hands after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Full contact
Material: butyl-rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Butoject® (KCL 898)

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Splash contact
Material: Latex gloves
Minimum layer thickness: 0.6 mm
Break through time: 10 min
Material tested:Lapren® (KCL 706 / Aldrich Z677558, Size M)

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Body Protection
Flame retardant antistatic protective clothing.

Respiratory protection
Recommended Filter type: Filter type AX
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when vapours/aerosols are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains. Risk of explosion.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: clear, liquid Color: colorless
b)	Odor	pungent, weakly aromatic
c)	Odor Threshold	0.1 ppm
d)	pH	5 - 6 at 395 g/l at 20 °C (68 °F)
e)	Melting point/freezing point	Melting point/ range: -94 °C (-137 °F) - lit.
f)	Initial boiling point and boiling range	56 °C 133 °F at 1,013 hPa - lit.
g)	Flash point	-17.0 °C (1.4 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 13 %(V) Lower explosion limit: 2 %(V)
k)	Vapor pressure	245.3 hPa at 20.0 °C (68.0 °F)
l)	Vapor density	No data available
m)	Density	0.791 g/cm3 at 25 °C (77 °F) - lit.
	Relative density	No data available
n)	Water solubility	soluble, in all proportions
o)	Partition coefficient: n-octanol/water	No data available
p)	Autoignition	465.0 °C (869.0 °F)

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	temperature	
q)	Decomposition temperature	Distillable in an undecomposed state at normal pressure.
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	none

9.2 Other safety information

Conductivity	0.01 µS/cm at 20 °C (68 °F)
Surface tension	23.2 mN/m at 20.0 °C (68.0 °F)

SECTION 10: Stability and reactivity

10.1 Reactivity

Vapors may form explosive mixture with air.

10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions

Risk of ignition or formation of inflammable gases or vapours with:
chromosulfuric acid
chromyl chloride
ethanolamine
Fluorine
Strong oxidizing agents
strong reducing agents
Nitric acid
chromium(VI) oxide
Risk of explosion with:
nonmetallic oxyhalides
halogen-halogen compounds
Chloroform
nitrating acid
nitrosyl compounds
hydrogen peroxide
halogen oxides
organic nitro compounds
peroxi compounds
Exothermic reaction with:
Bromine
Alkali metals
alkali hydroxides
Halogenated hydrocarbon
Sulfur dichloride
phosphorous oxichloride

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10.4 Conditions to avoid
Warming.

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - female - 5,800 mg/kg
Remarks: (ECHA)
Symptoms: Stomach/intestinal disorders, Risk of aspiration upon vomiting., Pulmonary failure possible after aspiration of vomit.
LC50 Inhalation - Rat - 4 h - 76 mg/l - vapor

Remarks: Unconsciousness
Drowsiness
Dizziness
(External MSDS)
LD50 Dermal - Rabbit - 20,000 mg/kg
Remarks: (IUCLID)

Skin corrosion/irritation
Skin - Rabbit
Result: Mild skin irritation - 24 h
(Draize Test)
Remarks: (RTECS)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Eye irritation - 24 h
(Draize Test)
Remarks: (RTECS)

Respiratory or skin sensitization
Maximization Test - Guinea pig
Result: negative
Remarks: (ECHA)
Chronic exposure may cause dermatitis.

Germ cell mutagenicity
Test Type: Mutagenicity (mammal cell test): chromosome aberration.
Test system: Chinese hamster ovary cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 473
Result: negative
Test Type: Ames test
Test system: Salmonella typhimurium
Metabolic activation: with and without metabolic activation

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Method: OECD Test Guideline 471
Result: negative
Test Type: In vitro mammalian cell gene mutation test
Test system: Mouse lymphoma test
Metabolic activation: without metabolic activation
Method: OECD Test Guideline 476
Result: negative

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
Inhalation - May cause drowsiness or dizziness. - Narcotic effects
Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

RTECS: AL3150000
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

After absorption:

Headache
Salivation
Nausea
Vomiting
Dizziness
narcosis
Coma

Other dangerous properties can not be excluded.

Handle in accordance with good industrial hygiene and safety practice.

Kidney - Irregularities - Based on Human Evidence

Skin - Dermatitis - Based on Human Evidence

Kidney - Irregularities - Based on Human Evidence

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Skin - Dermatitis - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	flow-through test LC50 - Pimephales promelas (fathead minnow) - 6,210 mg/l - 96 h (OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	static test LC50 - Daphnia pulex (Water flea) - 8,800 mg/l - 48 h Remarks: (ECHA)
Toxicity to algae	static test NOEC - M.aeruginosa - 530 mg/l - 8 d (DIN 38412) Remarks: (maximum permissible toxic concentration) (IUCLID)
Toxicity to bacteria	static test EC50 - activated sludge - 61.15 mg/l - 30 min (OECD Test Guideline 209)
Toxicity to daphnia and other aquatic invertebrates(Chronic toxicity)	flow-through test NOEC - Daphnia magna (Water flea) - 2,212 mg/l - 28 d Remarks: (ECHA)

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 28 d Result: 91 % - Readily biodegradable. (OECD Test Guideline 301B)
Biochemical Oxygen Demand (BOD)	1,850 mg/g Remarks: (IUCLID)
Chemical Oxygen Demand (COD)	2,070 mg/g Remarks: (IUCLID)
Theoretical oxygen demand	2,200 mg/g Remarks: (Lit.)

12.3 Bioaccumulative potential

Does not bioaccumulate.

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties

No data available

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12.7 Other adverse effects

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)
UN number: 1090 Class: 3 Packing group: II
Proper shipping name: Acetone
Reportable Quantity (RQ): 5000 lbs
Poison Inhalation Hazard: No

IMDG
UN number: 1090 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: ACETONE

IATA
UN number: 1090 Class: 3 Packing group: II
Proper shipping name: Acetone

SECTION 15: Regulatory information

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
acetone	67-64-1	5000	5000

SARA 304 Extremely Hazardous Substances Reportable Quantity
This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity
This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Fire Hazard
Acute Health Hazard
Chronic Health Hazard

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SARA 313 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

US State Regulations

Massachusetts Right To Know

acetone	67-64-1

Pennsylvania Right To Know

acetone	67-64-1

Maine Chemicals of High Concern

Product does not contain any listed chemicals

Vermont Chemicals of High Concern

Product does not contain any listed chemicals

Washington Chemicals of High Concern

Product does not contain any listed chemicals

The ingredients of this product are reported in the following inventories:

TSCA : All substances listed as active on the TSCA inventory

TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.11 Revision Date: 09/06/2024 Print Date: 09/07/2024

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SAFETY DATA SHEET

Version 6.7
Revision Date 09/09/2024
Print Date 09/10/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Acetophenone

Product Number : W200910
Brand : Aldrich
Index-No. : 606-042-00-1
CAS-No. : 98-86-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquids (Category 4), H227
Acute toxicity, Oral (Category 4), H302
Eye irritation (Category 2A), H319

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Short-term (acute) aquatic hazard (Category 3), H402

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal Word Warning

Hazard Statements

H227	Combustible liquid.
H302	Harmful if swallowed.
H319	Causes serious eye irritation.
H402	Harmful to aquatic life.

Precautionary Statements

P210	Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.
P280	Wear protective gloves/ eye protection/ face protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell. Rinse mouth.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P403 + P235	Store in a well-ventilated place. Keep cool.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	C_8H_8O
Molecular weight	:	120.15 g/mol
CAS-No.	:	98-86-2
EC-No.	:	202-708-7
Index-No.	:	606-042-00-1

Component	Classification	Concentration
acetophenone		
	Flam. Liq. 4; Acute Tox. 4; Eye Irrit. 2A; Aquatic Acute 3; H227, H302, H319, H402	<= 100 %

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For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

In case of eye contact
After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

If swallowed
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Water Foam Carbon dioxide (CO2) Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Carbon oxides
Combustible.
Vapors are heavier than air and may spread along floors.
Forms explosive mixtures with air on intense heating.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters
In the event of fire, wear self-contained breathing apparatus.

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operates as MilliporeSigma in the US and Canada

5.4 Further information

Remove container from danger zone and cool with water. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition.
Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up with liquid-absorbent material (e.g. Chemizorb®).
Dispose of properly. Clean up affected area.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on protection against fire and explosion

Keep away from open flames, hot surfaces and sources of ignition.Take precautionary measures against static discharge.

Hygiene measures

Change contaminated clothing. Preventive skin protection recommended. Wash hands after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions

Tightly closed.

Storage class

Storage class (TRGS 510): 10: Combustible liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

The life science business of Merck KGaA, Darmstadt, Germany
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SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
acetophenone	98-86-2	TWA	10 ppm	USA. ACGIH Threshold Limit Values (TLV)
		TWA	10 ppm	USA. Workplace Environmental Exposure Levels (WEEL)
		PEL	10 ppm 49 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

8.2 Exposure controls

Appropriate engineering controls
Change contaminated clothing. Preventive skin protection recommended. Wash hands after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Full contact
Material: butyl-rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Butoject® (KCL 898)

Splash contact
Material: Latex gloves
Minimum layer thickness: 0.6 mm
Break through time: 30 min
Material tested:Lapren® (KCL 706 / Aldrich Z677558, Size M)

Body Protection
protective clothing

Respiratory protection
Recommended Filter type: Filter A-(P2)
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when vapours/aerosols are generated. Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387

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and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: clear, liquid Color: colorless
b)	Odor	pleasant
c)	Odor Threshold	0.002 ppm
d)	pH	No data available
e)	Melting point/freezing point	Melting point/freezing point: 20 °C (68 °F)
f)	Initial boiling point and boiling range	202 °C 396 °F at 1,013 hPa
g)	Flash point	82 °C (180 °F) - closed cup - DIN 51758
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 5.2 %(V) Lower explosion limit: 1.4 %(V)
k)	Vapor pressure	0.45 hPa at 25 °C (77 °F)
l)	Vapor density	4.15 - (Air = 1.0)
m)	Density	1.03 g/cm3 at 25 °C (77 °F)
	Relative density	1.0320 °C
n)	Water solubility	6.3 g/l at 25 °C (77 °F) - soluble
o)	Partition coefficient: n-octanol/water	log Pow: 1.61 at 25 °C (77 °F) - Bioaccumulation is not expected.
p)	Autoignition temperature	535 °C (995 °F) at 1,013 hPa
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	none

9.2 Other safety information

Surface tension	39.04 mN/m at 25 °C (77 °F)

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Relative vapor density	4.15 - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity
Forms explosive mixtures with air on intense heating.
A range from approx. 15 Kelvin below the flash point is to be rated as critical.

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
Exothermic reaction with:
Strong oxidizing agents
strong alkalis
strong reducing agents

10.4 Conditions to avoid
Strong heating.

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 815 mg/kg
Remarks: (RTECS)
Inhalation: No data available
LD50 Dermal - Rat - male and female - 3,300 mg/kg
(OECD Test Guideline 402)

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation - 24 h
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Irritating to eyes.
Remarks: (RTECS)
Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Respiratory or skin sensitization
No data available

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Germ cell mutagenicity
Test Type: In vitro mammalian cell gene mutation test
Test system: mouse lymphoma cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
Result: negative
Test Type: Ames test
Test system: Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative
Test Type: Mutagenicity (mammal cell test): chromosome aberration.
Test system: Chinese hamster lung cells
Metabolic activation: Metabolic activation
Method: OECD Test Guideline 473
Result: positive
Test Type: Mutagenicity (mammal cell test): chromosome aberration.
Test system: Chinese hamster lung cells
Metabolic activation: without metabolic activation
Method: OECD Test Guideline 473
Result: negative

Test Type: Micronucleus test
Species: Mouse
Cell type: Red blood cells (erythrocytes)
Application Route: Intraperitoneal injection
Method: OECD Test Guideline 474
Result: negative

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

Repeated dose toxicity - Rat - male and female - Oral - 90 Days - NOAEL (No observed adverse effect level) - 250 mg/kg

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To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Other dangerous properties can not be excluded.

Handle in accordance with good industrial hygiene and safety practice.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	flow-through test LC50 - Pimephales promelas (fathead minnow) - 162 mg/l - 96 h (OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	static test LC50 - Daphnia magna (Water flea) - 528 mg/l - 48 h Remarks: (ECHA)
Toxicity to algae	static test ErC50 - Pseudokirchneriella subcapitata (green algae) - 86.4 mg/l - 72 h (OECD Test Guideline 201)
Toxicity to bacteria	static test IC50 - activated sludge - > 1,000 mg/l - 3 h (OECD Test Guideline 209)

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 14 d Result: 64.7 % - Readily biodegradable. (OECD Test Guideline 301C)

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties

No data available

12.7 Other adverse effects

Discharge into the environment must be avoided.

Stability in water	- 56 d Remarks: reaction with hydroxyl radicals

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SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)
Not dangerous goods

IMDG
Not dangerous goods

IATA
UN number: 3334 Class: 9 Packing group: III
Proper shipping name: Aviation regulated liquid, n.o.s. (acetophenone)

SECTION 15: Regulatory information

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
acetophenone	98-86-2	5000	5000

SARA 304 Extremely Hazardous Substances Reportable Quantity
This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity
This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Fire Hazard
Acute Health Hazard

SARA 313 : The following components are subject to reporting levels established by SARA Title III, Section 313:

acetophenone 98-86-2 >= 90 - <= 100 %

US State Regulations

Massachusetts Right To Know
acetophenone 98-86-2

Pennsylvania Right To Know
acetophenone 98-86-2

Maine Chemicals of High Concern

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Product does not contain any listed chemicals

Vermont Chemicals of High Concern

Product does not contain any listed chemicals

Washington Chemicals of High Concern

Product does not contain any listed chemicals

The ingredients of this product are reported in the following inventories:

TSCA : All substances listed as active on the TSCA inventory

TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.7 Revision Date: 09/09/2024 Print Date: 09/10/2024

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SAFETY DATA SHEET

Version 4.8
Revision Date 05/03/2017
Print Date 07/13/2017

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : α-Chlordane

Product Number : 442449
Brand : Supelco

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 4), H302
Acute toxicity, Inhalation (Category 4), H332
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Carcinogenicity (Category 2), H351
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)

H302 + H332	Harmful if swallowed or if inhaled
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H351	Suspected of causing cancer.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201	Obtain special instructions before use.

P202	Do not handle until all safety precautions have been read and understood.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Molecular weight : 409.8 g/mol
EC-No. : 225-825-5

Hazardous components

Component	Classification	Concentration
Chlordane		
	Acute Tox. 4; Skin Irrit. 2; Eye Irrit. 2A; Carc. 2; STOT SE 3; Aquatic Acute 1; Aquatic Chronic 1; H302 + H332, H315, H319, H335, H351, H410	90 - 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.
Hazardous components without workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator.For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: crystalline Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	93.0 - 94.0 °C (199.4 - 201.2 °F)
f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
h)	Evaporation rate	No data available

i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 500 mg/kg

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Chlordane)

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: Not available

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Lepomis macrochirus (Bluegill) - 0.0074 mg/l - 96 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential

Bioaccumulation	Lepomis macrochirus (Bluegill) - 24 h - 0.005 mg/l
	Bioconcentration factor (BCF): 322

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (Chlordane)
Reportable Quantity (RQ): Marine pollutant:yes
Poison Inhalation Hazard: No

IMDG
UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Chlordane)
Marine pollutant:yes

IATA
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Chlordane)

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Chlordane	5103-71-9	

	CAS-No.	Revision Date
Chlordane	5103-71-9	

New Jersey Right To Know Components

	CAS-No.	Revision Date
Chlordane	5103-71-9	

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
Eye Irrit.	Eye irritation
H302	Harmful if swallowed.
H302 + H332	Harmful if swallowed or if inhaled
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H335	May cause respiratory irritation.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.8 Revision Date: 05/03/2017 Print Date: 07/13/2017

SAFETY DATA SHEET

1. Identification

Product identifier **ATOMIZED ALUMINUM POWDER**

Other means of identification

SDS number 123

Chemical formula Al

Version # 08

Revision date August 11, 2015.

Other means of identification

Synonyms All non-alloyed, non-coated nodular aluminum powder containing < 1% trace elements * Grade 13, 101, 102, 104, 101T, 120, 121, 123, 1124, 1202, 1233, 1235, 1401/S2(1406), 1403, 1404, 1407, 1401/S9(1409), 1125, * 4402, 6401, 7123, 7124, 7125, 7401

Recommended use Various metallurgical/chemical/structural/coating applications

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer

Alcoa Inc.
201 Isabella Street
Pittsburgh, PA USA 15212
Health and Safety Tel: +1-412-553-4649
Health and Safety Fax: +1-412-553-4822
Health and Safety Email: accmsds@alcoa.com

Alcoa Inc.
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P.O. Box 472
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Tel: +1-512-446-8681

Poços de Caldas
Rodovia Poços de Caldas/Andradas, km 10
CEP 37.719-900
Poços de Caldas, Minas Gerais
Tel.: (+55 35) 2101-5000
E-mail: pfacomercialprimarios@alcoa.com.br

Emergency Information CHEMTREC: +1-703-527-3887 +1-800-424-9300 (24 Hour Emergency Telephone, multiple languages spoken); ALCOA: +1-412-553-4001 (24 Hour Emergency Telephone, only English spoken)

Website For a current Safety Data Sheet, refer to Alcoa websites: www.alcoa.com or internally at my.alcoa.com EHS Community

2. Hazard(s) identification

Physical hazards Not classified.

Health hazards Not classified.

Environmental hazards Not classified.

Authority defined hazards Combustible dust

Label elements

Hazard symbol None.

Signal word Warning

Hazard statement May form combustible dust concentrations in air.

Precautionary statement

Prevention	Care should be taken during bulk handling to prevent accumulation/generation over time of 75 micron or finer particles. Use only non-sparking tools and natural bristle brushes. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting equipment. Prevent dust accumulation to minimize explosion hazard. Take precautionary measures against static discharge.
Response	In case of fire: Use appropriate media for extinction.
Storage	Store in a dry place and/or in closed container. Keep away from heat, sparks and open flame - No smoking.Do not allow chips, fines or dust to contact water, particularly in enclosed areas.
Disposal	Reuse or recycle material whenever possible. Material that cannot be reused may be sent to a metals reclamation facility that is able to handle fines. Waste material that cannot be reclaimed for metal value should be rendered non-reactive prior to disposal.
Hazard(s) not otherwise classified (HNOC)	None known.
Supplemental information	Powder may ignite readily. Powder or dusts dispersed in the air can be explosive. Explosion/fire hazards may be present when: • Powder or dust are dispersed in air. • Powder or dusts are in contact with water. • Powder or dusts are in contact with certain metal oxides (e.g., rust, copper oxide).

3. Composition/information on ingredients

Composition comments Complete composition is provided below and may include some components classified as non-hazardous.

Substances

Chemical name	Common name and synonyms	CAS number	%
Aluminum powder		7429-90-5	≥99.7

4. First-aid measures

Eye contact	Dust from processing: Rinse eyes with plenty of water or saline for at least 15 minutes. Consult a physician.
Skin contact	Dust from processing: Wash with soap and water for at least 15 minutes. Get medical attention if irritation develops or persists.
Inhalation	Dust from processing: Remove to fresh air. Check for clear airway, breathing, and presence of pulse. If breathing is difficult, provide oxygen. Loosen any tight clothing on neck or chest. Provide cardiopulmonary resuscitation for persons without pulse or respirations. Consult a physician.
Ingestion	If swallowed, dilute by drinking water. Recommend quantities up to 30 mL (~1 oz.) in children and 250 mL (~9 oz.) in adults. Never give anything by mouth to a victim who is unconscious or is having convulsions. Do NOT induce vomiting. Consult a physician.
Most important symptoms/effects, acute and delayed	Dust from processing: Can cause irritation of the upper respiratory tract. See Section 11 of the SDS for additional information on health hazards.
Medical conditions aggravated by exposure	Asthma, chronic lung disease, and skin rashes.
Indication of immediate medical attention and special treatment needed	Provide general supportive measures and treat symptomatically. In case of shortness of breath, give oxygen.
General information	If exposed or concerned: Get medical advice/attention. In case of shortness of breath, give oxygen.

5. Fire-fighting measures

Suitable extinguishing media	Use Class D extinguishing agents on fines, dust or molten metal.
Unsuitable extinguishing media	DO NOT USE water, halogenated agents, or ABC dry chemical agents. These fire extinguishing agents will react with the burning material.

Specific hazards arising from the chemical	Alcoa aluminum powders were tested by the United States Department of Interior Bureau of Mines in 1991, under UN criteria and found not to meet the definition of a hazard class 4. Care should be taken, however, during bulk handling to prevent accumulation/generation over time of 75 micron or finer particles. May be a potential hazard under the following conditions: • Dust clouds may be explosive. Even a minor dust cloud can explode violently. Dust accumulation on the floor, ledges and beams can present a risk of ignition, flame propagation and secondary explosions. • Powder or dusts in contact with water can generate flammable/explosive hydrogen gas. These gases could present an explosion hazard in confined or poorly ventilated spaces. • Powder or dusts are in contact with certain metal oxides (e.g., rust, copper oxide).
Special protective equipment and precautions for firefighters	Firefighters should wear NIOSH approved, positive pressure, self-contained breathing apparatus and full protective clothing when appropriate.
Fire fighting equipment/instructions	Use gentle surface application of Class D extinguishing agent or dry inert granular material (e.g., sand) to cover and ring the burning material. Avoid mixing of the extinguishing agent with the burning material. Apply extinguishing media carefully to avoid creating airborne dust. Do not disturb the material until completely cool. If possible, isolate the burning material to prevent fire spread, and allow the material to burn itself out. Move undamaged containers away from heat or flame, if possible.
General fire hazards	Dust and fines from processing may ignite readily. Dust or fines dispersed in the air can be explosive.
Explosion data	
Sensitivity to mechanical impact	Not sensitive.
Sensitivity to static discharge	Static electricity and formation of sparks must be prevented. Prevent electrostatic charge build-up by using common bonding and grounding techniques. Use non-sparking handling equipment, tools and natural bristle brushes. Cover and reseal partially empty containers. Provide grounding and bonding where necessary to prevent accumulation of static charges during metal dust handling and transfer operations. Obtain and follow the safety procedures and equipment guides contained in Aluminum Association Bulletin F-1 and National Fire Protection Association (NFPA) Standards listed in Section 16. Use non-sparking handling equipment, tools and natural bristle brushes. Cover and reseal partially empty containers. Provide grounding and bonding where necessary to prevent accumulation of static charges during metal dust handling and transfer operations (See Section 15).

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Avoid contact with skin and eyes. Use personal protection recommended in Section 8 of the SDS.
Personal precautions, protective equipment and emergency procedures	
For emergency responders	Avoid contact with skin and eyes. Use personal protection recommended in Section 8 of the SDS.
Evacuation procedures	Keep people away from and upwind of spill/leak. Keep unnecessary personnel away.
Methods and materials for containment and cleaning up	Isolate area. Avoid the generation of dusts during clean-up. Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Use only non-sparking tools and natural bristle brushes. Use dry cleanup procedures. Keep material dry. Place carefully in dry, water-tight containers. Seal containers. After complete clean-up by sweeping, area may be washed with large amounts of water if necessary. Material that cannot be reused may be sent to a metals reclamation facility that is able to handle fines. Waste material that cannot be reclaimed for metal value should be rendered non-reactive prior to disposal. For waste disposal, see section 13 of the SDS.
Environmental precautions	No specific precautions.

7. Handling and storage

Handling	Keep away from sources of ignition - No smoking. Avoid contact with skin and eyes. Care should be taken during bulk handling to prevent accumulation/generation over time of 75 micron or finer particles. Keep material dry.
Storage	Keep dry. Storage rooms must be of fire-resistant construction. Do not store powder in same room as other combustible materials.

Requirements for Processes Which Generate Dusts or Fines

Obtain and follow the safety procedures and equipment guides contained in Aluminum Association Bulletin TR-2 and National Fire Protection Association (NFPA) brochures listed in Section 16. Use non-sparking handling equipment, tools and natural bristle brush. Cover and reseal partially empty containers. Provide grounding and bonding where necessary to prevent accumulation of static charges during metal dust handling and transfer operations (See Section 15).

Local ventilation and vacuum systems must be designed to handle explosive dusts. Dry vacuums and electrostatic precipitators must not be used, unless specifically approved for use with flammable/explosive dusts. Dust collection systems must be dedicated to aluminum dust only and should be clearly labeled as such. Do not co-mingle fines of aluminum with fines of iron, iron oxide (rust) or other metal oxides.

Process equipment, storage containers, vessels and buildings should be equipped with explosion/pressure relief valves, panels and windows. Precautions must also be taken to prevent water leakage or seepage which could contact the powder. Refer to NFPA 484.

Avoid all ignition sources. Good housekeeping practices must be maintained. Dust accumulation on the floor, ledges and beams can present a risk of ignition, flame propagation and secondary explosions. Do not use compressed air to remove settled material from floors, beams or equipment . Do not allow fines or dust to contact water, particularly in enclosed areas.

8. Exposure controls/personal protection

Occupational exposure limits

U.S. - OSHA

Components	Type	Value	Form
Aluminum powder (CAS 7429-90-5)	TWA	15 mg/m3	(total dust)

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Material	Type	Value	Form
ATOMIZED ALUMINUM POWDER	PEL	5 mg/m3	Respirable dust.
		15 mg/m3	Total dust.

Components	Type	Value	Form
Aluminum powder (CAS 7429-90-5)	TWA	5 mg/m3	Respirable dust.

US ACGIH Threshold Limit Values: Time Weighted Average (TWA): mg/m3, non-standard units

Material	Type	Value	Form
ATOMIZED ALUMINUM POWDER	TWA	1 mg/m3	Respirable fraction.

Components	Type	Value	Form
Aluminum powder (CAS 7429-90-5)	TWA	1 mg/m3	Respirable fraction.

Alcoa

Material	Type	Value	Form
ATOMIZED ALUMINUM POWDER	TWA	3 mg/m3	Respirable fraction
		10 mg/m3	Total dust

Components	Type	Value	Form
Aluminum powder (CAS 7429-90-5)	TWA	3 mg/m3	Respirable fraction
		10 mg/m3	Total dust

General Use personal protective equipment as required.

Appropriate engineering controls Dust from processing: Use with adequate explosion-proof ventilation designed to handle particulates to meet the limits listed in Section 8, Exposure Guidelines.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear safety glasses with side shields.

Skin protection

Hand protection Wear impervious gloves to avoid direct skin contact.

Other	Recommend fire resistant cotton or equivalent full-length fire resistant pants and jackets along with electrically conductive safety shoes or grounding straps. Great caution is required to avoid contact with unprotected electrical devices when wearing conductive safety shoes or grounding straps.
Respiratory protection	Use NIOSH-approved respiratory protection as specified by an Industrial Hygienist or other qualified professional if concentrations exceed the limits listed in Section 8. Suggested respiratory protection: N95.
Thermal hazards	Not applicable.
General hygiene considerations	Handle in accordance with good industrial hygiene and safety practice. When using, do not eat, drink or smoke. Wash hands before breaks and immediately after handling the product.
Control parameters	

9. Physical and chemical properties

Form	Solid, powder.
Color	Silvery to gray.
Odor	Odorless
Odor threshold	Not applicable
pH	Not applicable
Density	0.80 - 1.30 g/cm3
Melting point/freezing point	1194.8 - 1214.6 °F (646 - 657 °C) 1220 °F (660 °C)
Initial boiling point and boiling range	Not determined 4220.6 °F (2327 °C)
Flash point	Not applicable
Evaporation rate	Not applicable
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	
Flammability limit - upper (%)	Not determined
Flammability limit - lower (%)	40 mg/l
Explosive properties	Dust can form an explosive mixture in air. Dust accumulation from this product may present an explosion hazard in the presence of an ignition source.
Dust explosion properties	
St class	Very strong explosion.
Vapor pressure	Not applicable
Vapor density	Not applicable
Relative density	Not determined
Solubility(ies)	Insoluble Insoluble
Partition coefficient (n-octanol/water)	Not applicable. Not applicable
Auto-ignition temperature	1202 °F (650 °C) layered
Decomposition temperature	Not applicable
Viscosity	Not applicable

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Stable under normal conditions of use, storage, and transportation as shipped.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	• Water: Slowly generates flammable and explosive hydrogen gas and heat. Generation rate is greatly increased with smaller particles (e.g., fines and dusts). Water/aluminum mixtures may be hazardous when confined. • Heat: Oxidizes at a rate dependent upon temperature and particle size.

Incompatible materials	• Acids and alkalis: Reacts to generate flammable/explosive hydrogen gas. Generation rate is greatly increased with smaller particles (e.g., fines and dusts). • Strong oxidizers: Violent reaction with considerable heat generation. Can react explosively with nitrates (e.g., ammonium nitrate and fertilizers containing nitrate) when heated or molten. • Halogenated compounds: Many halogenated hydrocarbons, including halogenated fire extinguishing agents, can react violently with finely divided or molten aluminum. • Iron oxide (rust) and other metal oxides (e.g., copper and lead oxides): A violent thermite reaction generating considerable heat can occur. Reaction with aluminum fines and dusts requires only very weak ignition sources for initiation. • Iron powder and water: Explosive reaction forming hydrogen gas when heated above 1470°F (800°C).
Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

Health effects associated with ingredients

Aluminum dust/fines and fumes: Low health risk by inhalation. Generally considered to be biologically inert.

Health effects associated with compounds formed during processing

No new/additional compounds are expected to be formed during processing.

Information on likely routes of exposure

Eye contact	Can cause mechanical irritation.
Skin contact	Dust from processing: Can cause mechanical irritation.
Inhalation	Dust from processing: Can cause irritation of the upper respiratory tract.
Ingestion	Can cause irritation of the gastrointestinal tract.
Symptoms related to the physical, chemical and toxicological characteristics	Dust from processing: Can cause mechanical irritation. Dust: Can cause irritation of the upper respiratory tract.

Information on toxicological effects

Acute toxicity	Based on available data, the classification criteria are not met.
Skin corrosion/irritation	Non-corrosive.
Serious eye damage/eye irritation	Can cause mechanical irritation.
Respiratory or skin sensitization	
Respiratory sensitization	Not a respiratory sensitizer.
Skin sensitization	Not a skin sensitizer.
Germ cell mutagenicity	Based on available data, the classification criteria are not met.
Neurological effects	Based on available data, the classification criteria are not met.
Pre-existing conditions aggravated by exposure	Asthma, chronic lung disease, and skin rashes.
Carcinogenicity	Does not present any cancer hazards.
Reproductive toxicity	Does not present any reproductive hazards.
Routes of exposure	Inhalation. Skin contact. Eye contact.
Specific target organ toxicity - single exposure	Based on available data, the classification criteria are not met.
Specific target organ toxicity - repeated exposure	Based on available data, the classification criteria are not met.
Aspiration hazard	Not an aspiration hazard.
Chronic effects	Not classified.
Further information	None known.

12. Ecological information

Ecotoxicity	Not expected to be harmful to aquatic organisms.

Product		Species	Test Results
ATOMIZED ALUMINUM POWDER			
Aquatic			
Fish	LC50	Rainbow trout,donaldson trout (Oncorhynchus mykiss)	0.16 mg/l, 96 hours

Persistence and degradability The product is not biodegradable.

Bioaccumulative potential The product does not contain any substances expected to be bioaccumulating.

Mobility in soil Not considered mobile.

Mobility in general Not considered mobile.

Other adverse effects Not available.

13. Disposal considerations

Disposal instructions Reuse or recycle material whenever possible. Material that cannot be reused may be sent to a metals reclamation facility that is able to handle fines. Waste material that cannot be reclaimed for metal value should be rendered non-reactive prior to disposal.

Local disposal regulations Dispose in accordance with all applicable regulations.

Waste codes RCRA Status: Not federally regulated in the U.S. if disposed of "as is."
RCRA waste codes other than described here may apply depending on use of the product. Status must be determined at the point of waste generation. Refer to 40 CFR 261 or state equivalent in the U.S.

Waste from residues / unused products If reuse or recycling is not possible, disposal must be made according to local or governmental regulations.

Contaminated packaging Dispose of in accordance with local regulations.

14. Transport information

General Shipping Information

Basic Shipping Information

ID number -

Proper shipping name Not regulated

Hazard class -

Packing group -

General Shipping Notes

• This material has been tested under UN criteria and found not to meet the definition of a hazard class 4 and does not meet the definition of any other hazard class.
• Standard Transportation Commodity Code: 33-991-19.
• HTS (Harmonized Tariff Schedule) code: 7603.10.0000.
• The import/export HTS (Harmonized Tariff Schedule) code given above is the United States HTS code provided by Alcoa's Customs Compliance Office in Knoxville, TN. Other country specific HTS codes may apply. If available, more information on the HTS codes will be provided on country specific Material Safety Data Sheets.
• When "Not regulated", enter the proper freight classification, SDS Number and Product Name onto the shipping paperwork.

Disclaimer

This section provides basic classification information and, where relevant, information with respect to specific modal regulations, environmental hazards and special precautions. Otherwise, it is presumed that the information is not available/not relevant

15. Regulatory information

US federal regulations In reference to Title VI of the Clean Air Act of 1990, this material does not contain nor was it manufactured using ozone-depleting chemicals.
All electrical equipment must be suitable for use in hazardous atmospheres involving aluminum powder in accordance with 29 CFR 1910.307. The National Electrical Code, NFPA 70, contains guidelines for determining the type and design of equipment and installation which will meet this requirement.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Section 311/312 hazard categories

Immediate Hazard - No
Delayed Hazard - No
Fire Hazard - No
Pressure Hazard - Yes — If dust clouds are generated
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical Yes

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Aluminum powder	7429-90-5	≥99.7

US state regulations

US. California Proposition 65

Not Listed.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

SDS Status

August 11, 2015: Change(s) in Section: 1 and 16.
April 30, 2015 (April 30, 2015 Minor modification 0123usa): Change(s) in Section: 1, 2 Minor modification..
January 7, 2015: Change(s) in Section: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 and 16.

Origination date: September 17, 1980

Hazardous Materials Control Committee
Preparer: Jim Perriello, +1-865-977-2051.

SDS System Number: 145308

Revision date August 11, 2015.

Version # 08

Revision Information

Product and Company Identification: Synonyms
Composition / Information on Ingredients: Disclosure Overrides
Physical & Chemical Properties: Multiple Properties
Transport Information: Agency Name, Packaging Type, and Transport Mode Selection
Regulatory Information: United States
HazReg Data: North America
GHS: Classification

Disclaimer The information in the sheet was written based on the best knowledge and experience currently available.

Other information

• Aluminum Association Bulletin TR-2, "Recommendations for Storage and Handling of Aluminum Pigments and Powders." The Aluminum Association, 1525 Wilson Boulevard, Suite 600, Arlington, Virginia 22209, www.aluminum.org.
• Aluminum Association, "Guidelines for Handling Molten Aluminum, The Aluminum Association, 1525 Wilson Boulevard, Suite 600, Arlington, Virginia 22209, www.aluminum.org.
• NFPA 484, Standard for Combustible Metals (NFPA phone: 800-344-3555)
• NFPA 654, Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids
• NFPA 70, Standard for National Electrical Code (Electrical Equipment, Grounding and Bonding)
• NFPA 77, Standard for Static Electricity
• NFPA 68, Standard on Explosion Protection by Deflagration Venting • NFPA 69, Standard on Explosion Prevention Systems

Key/Legend:

ACGIH	American Conference of Governmental Industrial Hygienists
AICS	Australian Inventory of Chemical Substances
CAS	Chemical Abstract Services
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CPR	Cardio-pulmonary Resuscitation
DOT	Department of Transportation
DSL	Domestic Substances List (Canada)
EC	Effective Concentration
ED	Effective Dose
EINECS	European Inventory of Existing Commercial Chemical Substances
ENCS	Japan - Existing and New Chemical Substances
EWC	European Waste Catalogue
EPA	Environmental Protective Agency
IARC	International Agency for Research on Cancer
LC	Lethal Concentration
LD	Lethal Dose
MAK	Maximum Workplace Concentration (Germany) "maximale Arbeitsplatz-Konzentration"
NDSL	Non-Domestic Substances List (Canada)
NIOSH	National Institute for Occupational Safety and Health
NTP	National Toxicology Program
OEL	Occupational Exposure Limit
OSHA	Occupational Safety and Health Administration
PIN	Product Identification Number
PMCC	Pensky Marten Closed Cup
RCRA	Resource Conservation and Recovery Act
SARA	Superfund Amendments and Reauthorization Act
SIMDUT	Système d'Information sur les Matières Dangereuses Utilisées au Travail
STEL	Short Term Exposure Limit
TCLP	Toxic Chemicals Leachate Program
TDG	Transportation of Dangerous Goods
TLV	Threshold Limit Value
TSCA	Toxic Substances Control Act
TWA	Time Weighted Average
WHMIS	Workplace Hazardous Materials Information System

m meter, cm centimeter, mm millimeter, in inch,
g gram, kg kilogram, lb pound, µg microgram,
ppm parts per million, ft feet

*** End of SDS ***

Hazard statement

May form combustible dust concentrations in air.

Precautionary statement

Prevention

Care should be taken during bulk handling to prevent accumulation/generation over time of 75 micron or finer particles. Use only non-sparking tools and natural bristle brushes. Keep away from heat/sparks/open flames/hot surfaces - No smoking. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting equipment. Prevent dust accumulation to minimize explosion hazard. Take precautionary measures against static discharge.

Response

In case of fire: Use appropriate media for extinction.

Storage

Store in a dry place and/or in closed container. Keep away from heat, sparks and open flame - No smoking. Do not allow chips, fines or dust to contact water, particularly in enclosed areas.

Disposal

Reuse or recycle material whenever possible. Material that cannot be reused may be sent to a metals reclamation facility that is able to handle fines. Waste material that cannot be reclaimed for metal value should be rendered non-reactive prior to disposal.

Warning

Supplemental information

Powder may ignite readily. Powder or dusts dispersed in the air can be explosive.

Explosion/fire hazards may be present when:

- Powder or dust are dispersed in air.
- Powder or dusts are in contact with water.
- Powder or dusts are in contact with certain metal oxides (e.g., rust, copper oxide).

FIRE FIGHTING MEASURES: Use gentle surface application of Class D extinguishing agent or dry inert granular material (e.g., sand) to cover and ring the burning material. Avoid mixing of the extinguishing agent with the burning material. If possible, isolate the burning material to prevent fire spread, and allow the material to burn itself out. Do not disturb the material until completely cool. Move undamaged containers away from heat or flame, if possible.

DO NOT USE water, halogenated agents, or ABC dry chemical agents.

These fire extinguishing agents will react with the burning material.

IN CASE OF SPILL: Avoid dusting of powder to the greatest extent possible. Use only non-sparking tools and natural bristle brushes. ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Prohibit smoking. Use dry cleanup procedures. Place carefully in dry, water-tight containers. Seal containers. After complete clean-up by sweeping, area may be washed with large amounts of water if necessary.

See Alcoa SDS Number 0123.

SAFETY DATA SHEET

Version 4.9
Revision Date 04/20/2015
Print Date 12/11/2015

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Anthracene

Product Number : A89200
Brand : Aldrich

CAS-No. : 120-12-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264 Wash skin thoroughly after handling.
P271 Use only outdoors or in a well-ventilated area.
P273 Avoid release to the environment.
P280 Wear eye protection/ face protection.

P280	Wear protective gloves.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Photosensitizer., Lachrymator.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	$C_{14}H_{10}$
Molecular weight	:	178.23 g/mol
CAS-No.	:	120-12-7
EC-No.	:	204-371-1

Hazardous components

Component	Classification	Concentration
Anthracene Included in the Candidate List of Substances of Very High Concern (SVHC) according to Regulation (EC) No. 1907/2006 (REACH)		
	Skin Irrit. 2; Eye Irrit. 2A; STOT SE 3; Aquatic Acute 1; Aquatic Chronic 1; H315, H319, H335, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Anthracene	120-12-7	TWA	0.200000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	Remarks	1910.1002 As used in §1910.1000 (Table Z-1), coal tar pitch volatiles include the fused polycyclic hydrocarbons which volatilize from the distillation residues of coal, petroleum (excluding asphalt), wood, and other organic matter. Asphalt (CAS 8052-42-4, and CAS 64742-93-4) is not covered under the 'coal tar pitch volatiles' standard OSHA specifically regulated carcinogen		

		TWA	0.100000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen NIOSH considers coal tar, coal tar pitch, and creosote to be coal tar products. cyclohexane-extractable fraction See Appendix C See Appendix A		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Anthracene	120-12-7	1-Hydroxypyrene (1-HP)		Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift at end of workweek			

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Chloroprene
Minimum layer thickness: 0.6 mm
Break through time: 480 min
Material tested:Camapren® (KCL 722 / Aldrich Z677493, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 30 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator.For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: crystalline Colour: beige
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 210 - 215 °C (410 - 419 °F) - lit.
f)	Initial boiling point and boiling range	340 °C (644 °F) - lit.
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Lower explosion limit: 0.6 %(V)
k)	Vapour pressure	1.3 hPa (1.0 mmHg) at 145.0 °C (293.0 °F)
l)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	log Pow: 4.45
p)	Auto-ignition temperature	540.0 °C (1,004.0 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents, Hypochlorites

10.6 Hazardous decomposition products

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
Inhalation: No data available

Dermal: No data available

LD50 Intraperitoneal - Mouse - 430 mg/kg

Skin corrosion/irritation
Skin - Mouse
Result: Mild skin irritation

Serious eye damage/eye irritation
Irritating to eyes. The preceding data, or interpretation of data, was determined using Quantitative Structure Activity Relationship (QSAR) modeling.

Respiratory or skin sensitisation
Causes photosensitivity. Exposure to light can result in allergic reactions resulting in dermatologic lesions, which can vary from sunburnlike responses to edematous, vesiculated lesions, or bullae

Germ cell mutagenicity
No data available

Carcinogenicity

IARC:	3 - Group 3: Not classifiable as to its carcinogenicity to humans (Anthracene)
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	OSHA specifically regulated carcinogen (Anthracene)

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure
Inhalation - May cause respiratory irritation.
The preceding data, or interpretation of data, was determined using Quantitative Structure Activity Relationship (QSAR) modeling.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: CA9350000

Possible tumor promoter., Headache, Nausea, Weakness

Blood -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Lepomis macrochirus (Bluegill) - 0.001 mg/l - 96.0 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 0.10 mg/l - 48 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
Indication of bioaccumulation.
Bioaccumulation Pimephales promelas (fathead minnow) - 42 d
- 0.01191 mg/l

Bioconcentration factor (BCF): 649

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (Anthracene)
Reportable Quantity (RQ): 5000 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Anthracene)
Marine pollutant:yes

IATA
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Anthracene)

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Anthracene	120-12-7	2007-07-01

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Anthracene	120-12-7	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Anthracene	120-12-7	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Anthracene	120-12-7	2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No.	Revision Date
Anthracene	120-12-7	2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Eye Irrit.	Eye irritation
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.9 Revision Date: 04/20/2015 Print Date: 12/11/2015

Antimony

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Revision Date: 02/12/2014 Version: 1.0

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY

1.1. Product Identifier

Product Form: Substance

Product Name: Antimony

Synonyms: Stibium (Sb)

1.2. Intended Use of the Product No additional information available

1.3. Name, Address, and Telephone of the Responsible Party

Company

Atomized Products Group, Inc
3838 Miller Park Dr
Garland, TX 75042
T 972-272-9596
atomizedproductsgroup.com

1.4. Emergency Telephone Number

Emergency Number : 800-255-3924 (CHEMTEL)

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the Substance or Mixture

Classification (GHS-US)

Comb. Dust
Acute Tox. 3 (Oral) H301
Acute Tox. 4 (Inhalation:dust,mist) H332
Carc. 2 H351
Aquatic Acute 2 H401
Aquatic Chronic 2 H411

2.2. Label Elements

GHS-US Labeling

Hazard Pictograms (GHS-US) :

GHS06 GHS07 GHS08 GHS09

Signal Word (GHS-US) : Danger

Hazard Statements (GHS-US) : May form combustible dust concentrations in air
H301 - Toxic if swallowed
H332 - Harmful if inhaled
H351 - Suspected of causing cancer
H401 - Toxic to aquatic life
H411 - Toxic to aquatic life with long lasting effects

Precautionary Statements (GHS-US) : P201 - Obtain special instructions before use.
P202 - Do not handle until all safety precautions have been read and understood.
P261 - Avoid breathing dust.
P264 - Wash hands, forearms, and other exposed areas thoroughly after handling.
P270 - Do not eat, drink or smoke when using this product.
P271 - Use only outdoors or in a well-ventilated area.
P273 - Avoid release to the environment.
P280 - Wear protective gloves, protective clothing, eye protection, face protection, respiratory protection.
P301+P310 - IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P304+P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P308+P313 - If exposed or concerned: Get medical advice/attention.

P312 - Call a POISON CENTER/doctor/physician if you feel unwell.
P321 - Specific treatment (see section 4).
P330 - If swallowed, rinse mouth.
P391 - Collect spillage.
P405 - Store locked up.
P501 - Dispose of contents/container to local, regional, national, territorial, provincial, and international regulations.

2.3. Other Hazards

Other Hazards Not Contributing to the Classification: Exposure may aggravate those with pre-existing eye, skin, or respiratory conditions. May form combustible dust concentrations in air. Exposure may aggravate individuals with pre-existing skin, kidney, liver, and pulmonary disorders. On burning release of harmful/irritant gases/vapours (antimony oxides). Inhalation of dusts and fumes can cause metal fume fever. Symptoms can include a metallic or sweet taste in the mouth, sweating, shivering, headache, throat irritation, fever, chills, thirstiness, muscle aches, nausea, vomiting, weakness, fatigue, and shortness of breath.

2.4. Unknown Acute Toxicity (GHS-US)

No data available

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substance

Name : Antimony

Name	Product identifier	%	Classification (GHS-US)
Antimony	(CAS No) 7440-36-0	100	Comb. Dust Acute Tox. 3 (Oral), H301 Acute Tox. 4 (Inhalation), H332 Carc. 2, H351 Aquatic Acute 2, H401 Aquatic Chronic 2, H411

Full text of H-phrases: see section 16

3.2. Mixture

Not applicable

SECTION 4: FIRST AID MEASURES

4.1. Description of First Aid Measures

First-aid Measures General: Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).

First-aid Measures After Inhalation: When symptoms occur: go into open air and ventilate suspected area. Obtain medical attention if breathing difficulty persists.

First-aid Measures After Skin Contact: Remove contaminated clothing. Drench affected area with water for at least 15 minutes. Obtain medical attention if irritation persists.

First-aid Measures After Eye Contact: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Obtain medical attention if irritation persists.

First-aid Measures After Ingestion: Rinse mouth. Do not induce vomiting. Seek medical attention if a large amount is swallowed.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/Injuries: Suspected of causing cancer. Toxic if swallowed. Harmful if inhaled.

Symptoms/Injuries After Inhalation: Harmful if inhaled. Respiratory tract irritation.

Symptoms/Injuries After Skin Contact: Prolonged contact with large amounts of dust may cause mechanical irritation.

Symptoms/Injuries After Eye Contact: Prolonged contact with large amounts of dust may cause mechanical irritation.

Symptoms/Injuries After Ingestion: Toxic if swallowed. May cause nausea, vomiting, and diarrhea.

Chronic Symptoms: Prolonged exposure may cause effects in specific organs such as the liver, kidneys, blood, and nervous system.

4.3. Indication of Any Immediate Medical Attention and Special Treatment Needed

If exposed or concerned, get medical advice and attention.

SECTION 5: FIREFIGHTING MEASURES

5.1. Extinguishing Media

Suitable Extinguishing Media: Use extinguishing media appropriate for surrounding fire.

Unsuitable Extinguishing Media: Do not use a heavy water stream. Use of heavy stream of water may spread fire.

5.2. Special Hazards Arising From the Substance or Mixture

Fire Hazard: Not considered flammable but may burn at high temperatures. Dust explosion hazard in air.

Explosion Hazard: Avoid dust clouds in combination with static electricity. Dust explosion hazard in air.

Reactivity: Hazardous reactions will not occur under normal conditions. Dust clouds can be explosive.

5.3. Advice for Firefighters

Precautionary Measures Fire: Exercise caution when fighting any chemical fire.

Firefighting Instructions: Use water spray or fog for cooling exposed containers. In case of major fire and large quantities: Evacuate area. Fight fire remotely due to the risk of explosion.

Protection During Firefighting: Do not enter fire area without proper protective equipment, including respiratory protection.

Other information: Risk of dust explosion. Do not allow the product to be released into the environment. Do not allow run-off from fire fighting to enter drains or water courses.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal Precautions, Protective Equipment and Emergency Procedures

General Measures: Use special care to avoid static electric charges. Keep away from heat/sparks/open flames/hot surfaces. – No smoking. Handle in accordance with good industrial hygiene and safety practice. Do not breathe dust. Avoid generating dust. Avoid all contact with skin, eyes, or clothing.

6.1.1. For Non-emergency Personnel

Protective Equipment: Use appropriate personal protection equipment (PPE).

Emergency Procedures: Evacuate unnecessary personnel.

6.1.2. For Emergency Responders

Protective Equipment: Equip cleanup crew with proper protection. Use appropriate personal protection equipment (PPE).

Emergency Procedures: Ventilate area.

6.2. Environmental Precautions

Prevent entry to sewers and public waters. Do not allow to enter drains or water courses.

6.3. Methods and Material for Containment and Cleaning Up

For Containment: Avoid generation of dust during clean-up of spills. Use only non-sparking tools.

Methods for Cleaning Up: Clear up spills immediately and dispose of waste safely. Avoid generation of dust during clean-up of spills. Use only non-sparking tools. Use explosion proof vacuum during cleanup, with appropriate filter, do not mix with other materials. Contact competent authorities after a spill.

6.4. Reference to Other Sections

See heading 8, Exposure Controls and Personal Protection.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for Safe Handling

Additional Hazards When Processed: Avoid dust production. Accumulation and dispersion of dust with an ignition source can cause a combustible dust explosion, keep dust levels to a minimum and follow applicable regulations. Do not pressurize, cut, or weld containers. . On burning: release of harmful/irritant gases/vapours e.g.: (antimony oxides).

Precautions for Safe Handling: Use only non-sparking tools. Keep away from heat/sparks/open flames/hot surfaces. – No smoking. Handle in accordance with good industrial hygiene and safety procedures.

Hygiene Measures: Handle in accordance with good industrial hygiene and safety procedures. Wash hands and other exposed areas with mild soap and water before eating, drinking, or smoking and again when leaving work. Do no eat, drink or smoke when using this product.

7.2. Conditions for Safe Storage, Including Any Incompatibilities

Technical Measures: Proper grounding procedures to avoid static electricity should be followed. Ground/bond container and receiving equipment. Use explosion-proof electrical, ventilating, and lighting equipment. Comply with applicable regulations.

Storage Conditions: Store in a dry, cool and well-ventilated place. Keep container closed when not in use. Keep/Store away from extremely high or low temperatures, ignition sources, incompatible materials.

Incompatible Products: Strong acids. Strong bases. Strong oxidizers.

7.3. Specific End Use(s)

No additional information available

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control Parameters

Antimony (7440-36-0)		
USA ACGIH	ACGIH TWA (mg/m³)	0.5 mg/m³
USA NIOSH	NIOSH REL (TWA) (mg/m³)	0.5 mg/m³

USA IDLH	US IDLH (mg/m³)	50 mg/m³
USA OSHA	OSHA PEL (TWA) (mg/m³)	0.5 mg/m³

8.2. Exposure Controls

Appropriate Engineering Controls : Ensure all national/local regulations are observed. Proper grounding procedures to avoid static electricity should be followed. Use explosion-proof equipment. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment : Gloves. Protective goggles. Respiratory protection of the dependent type. Protective clothing.

Materials for Protective Clothing : Chemically resistant materials and fabrics.

Hand Protection : Wear chemically resistant protective gloves.

Eye Protection : Chemical goggles or safety glasses.

Skin and Body Protection : Wear suitable protective clothing.

Respiratory Protection : Use NIOSH-approved air-purifying or supplied-air respirator where airborne concentrations of dust are expected to exceed exposure limits.

Thermal Hazard Protection : Wear suitable protective clothing.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on Basic Physical and Chemical Properties

Physical State : Solid

Odor : No data available

Odor Threshold : No data available

pH : No data available

Relative Evaporation Rate (butylacetate=1) : No data available

Melting Point : No data available

Freezing Point : No data available

Boiling Point : No data available

Flash Point : No data available

Auto-ignition Temperature : No data available

Decomposition Temperature : No data available

Flammability (solid, gas) : No data available

Vapor Pressure : No data available

Relative Vapor Density at 20 °C : No data available

Relative Density : No data available

Specific Gravity : No data available

Solubility : No data available

Log Pow : No data available

Log Kow : No data available

Viscosity, Kinematic : No data available

Viscosity, Dynamic : No data available

Explosive Properties : No data available

Oxidizing Properties : No data available

Explosive Limits : No data available

9.2. Other Information No additional information available

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity: Hazardous reactions will not occur under normal conditions. Dust clouds can be explosive.

10.2 Chemical Stability: Dust clouds can be explosive.

10.3 Possibility of Hazardous Reactions: Hazardous polymerization will not occur.

10.4 Conditions to Avoid: Direct sunlight. Extremely high or low temperatures. Open flame. Ignition sources. Incompatible materials.

10.5 Incompatible Materials: Strong acids. Strong bases. Strong oxidizers. Halogenated compounds.

10.6 Hazardous Decomposition Products: Antimony and its oxides. Metal oxides. Inhalation of fumes may cause metal fume fever.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information On Toxicological Effects

Acute Toxicity: Toxic if swallowed. Harmful if inhaled.

Antimony	
ATE (Oral)	500.000 mg/kg body weight
ATE (Dust/Mist)	1.500 mg/l/4h

Antimony (7440-36-0)	
LD50 Oral Rat	100 mg/kg
ATE (Oral)	100.000 mg/kg body weight

Skin Corrosion/Irritation: Not classified

Serious Eye Damage/Irritation: Not classified

Respiratory or Skin Sensitization: Not classified

Germ Cell Mutagenicity: Not classified

Carcinogenicity: Suspected of causing cancer.

Reproductive Toxicity: Not classified

Specific Target Organ Toxicity (Single Exposure): Not classified

Specific Target Organ Toxicity (Repeated Exposure): Not classified

Aspiration Hazard: Not classified

Symptoms/Injuries After Inhalation: Harmful if inhaled. Respiratory tract irritation.

Symptoms/Injuries After Skin Contact: Prolonged contact with large amounts of dust may cause mechanical irritation.

Symptoms/Injuries After Eye Contact: Prolonged contact with large amounts of dust may cause mechanical irritation.

Symptoms/Injuries After Ingestion: Toxic if swallowed. May cause nausea, vomiting, and diarrhea.

Chronic Symptoms: Prolonged exposure may cause effects in specific organs such as the liver, kidneys, blood, and nervous system.

SECTION 12: ECOLOGICAL INFORMATION

12.1. Toxicity

Ecology - General : Toxic to aquatic life with long lasting effects.

12.2. Persistence and Degradability

Antimony	
Persistence and Degradability	May cause long-term adverse effects in the environment.

12.3. Bioaccumulative Potential No additional information available

12.4. Mobility in Soil No additional information available

12.5. Other Adverse Effects

Other Information : Avoid release to the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Waste Disposal Recommendations: Dispose of waste material in accordance with all local, regional, national, and international regulations.

Additional Information: The materials contained within this product are hazardous to the environment, do not release into the environment.

SECTION 14: TRANSPORT INFORMATION

14.1 In Accordance with DOT

Proper Shipping Name : ANTIMONY POWDER
Hazard Class : 6.1
Identification Number : UN2871
Label Codes : 6.1
Packing Group : III
Marine Pollutant : Marine pollutant
ERG Number : 170

14.2 In Accordance with IMDG

Proper Shipping Name : ANTIMONY POWDER
Hazard Class : 6.1
Identification Number : UN2871
Packing Group : III
Label Codes : 6.1
EmS-No. (Fire) : F-A
EmS-No. (Spillage) : S-A
MFAG Number : 171

14.3 In Accordance with IATA

Proper Shipping Name : ANTIMONY POWDER
Packing Group : III
Identification Number : UN2871
Hazard Class : 6
Label Codes : 6.1
ERG Code (IATA) : 6L

SECTION 15: REGULATORY INFORMATION

15.1 US Federal Regulations

Antimony	
SARA Section 311/312 Hazard Classes	Delayed (chronic) health hazard Immediate (acute) health hazard

Antimony (7440-36-0)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
Listed on SARA Section 313 (Specific toxic chemical listings)	
SARA Section 313 - Emission Reporting	1.0 %

15.2 US State Regulations

Antimony (7440-36-0)
U.S. - California - Priority Toxic Pollutants - Human Health Criteria
U.S. - California - Toxic Air Contaminant List (AB 1807, AB 2728)
U.S. - Colorado - Primary Drinking Water Regulations - Maximum Contaminant Level Goals (MCLGs)
U.S. - Colorado - Primary Drinking Water Regulations - Maximum Contaminant Levels (MCLs)
U.S. - Connecticut - Drinking Water Quality Standards - Maximum Contaminant Levels
U.S. - Connecticut - Hazardous Air Pollutants - HLVs (30 min)
U.S. - Connecticut - Hazardous Air Pollutants - HLVs (8 hr)
U.S. - Connecticut - Water Quality Standards - Consumption of Organisms Only
U.S. - Connecticut - Water Quality Standards - Consumption of Water and Organisms
U.S. - Connecticut - Water Quality Standards - Health Designations
U.S. - Delaware - Pollutant Discharge Requirements - Reportable Quantities
U.S. - Florida - Drinking Water Standards - Inorganic Contaminants - Maximum Contaminant Levels (MCLs)
U.S. - Georgia - Drinking Water - Maximum Contaminant Levels (MCLs)
U.S. - Idaho - Non-Carcinogenic Toxic Air Pollutants - Acceptable Ambient Concentrations
U.S. - Idaho - Non-Carcinogenic Toxic Air Pollutants - Emission Levels (ELs)
U.S. - Idaho - Occupational Exposure Limits - TWAs

U.S. - Illinois - Toxic Air Contaminants
U.S. - Louisiana - Reportable Quantity List for Pollutants
U.S. - Maine - Air Pollutants - Hazardous Air Pollutants
U.S. - Maryland - Surface Water Quality Standards - Consumption of Organisms Only
U.S. - Maryland - Surface Water Quality Standards - Consumption of Water and Organisms
U.S. - Massachusetts - Allowable Ambient Limits (AALs)
U.S. - Massachusetts - Allowable Threshold Concentrations (ATCs)
U.S. - Massachusetts - Drinking Water - Maximum Contaminant Levels (MCLs)
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 1
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 2
U.S. - Massachusetts - Oil & Hazardous Material List - Reportable Quantity
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 1
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 2
U.S. - Massachusetts - Right To Know List
U.S. - Massachusetts - Threshold Effects Exposure Limits (TELs)
U.S. - Massachusetts - Toxics Use Reduction Act
U.S. - Michigan - Occupational Exposure Limits - TWAs
U.S. - Michigan - Polluting Materials List
U.S. - Minnesota - Chemicals of High Concern
U.S. - Minnesota - Groundwater Health Risk Limits
U.S. - Minnesota - Hazardous Substance List
U.S. - Minnesota - Permissible Exposure Limits - TWAs
U.S. - Missouri - Drinking Water - Maximum Contaminant Levels (MCLs)
U.S. - Nebraska - Drinking Water - Maximum Contaminant Levels (MCLs)
U.S. - New Hampshire - Drinking Water - Maximum Contaminant Levels (MCLs)
U.S. - New Hampshire - Regulated Toxic Air Pollutants - Ambient Air Levels (AALs) - 24-Hour
U.S. - New Hampshire - Regulated Toxic Air Pollutants - Ambient Air Levels (AALs) - Annual
U.S. - New Jersey - Discharge Prevention - List of Hazardous Substances
U.S. - New Jersey - Environmental Hazardous Substances List
U.S. - New Jersey - Primary Drinking Water Standards - Maximum Contaminant Levels - MCLs
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - New Jersey - Water Quality - Ground Water Quality Criteria
U.S. - New Jersey - Water Quality - Practical Quantitation Levels (PQLs)
U.S. - New York - Occupational Exposure Limits - TWAs
U.S. - New York - Reporting of Releases Part 597 - List of Hazardous Substances
U.S. - North Dakota - Air Pollutants - Guideline Concentrations - 8-Hour
U.S. - North Dakota - Water Quality Standards - Human Health Value for Class III
U.S. - North Dakota - Water Quality Standards - Human Health Value for Classes I, IA, II
U.S. - Oregon - Permissible Exposure Limits - TWAs
U.S. - Pennsylvania - Drinking Water - Maximum Contaminant Levels (MCLs)
U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List
U.S. - Pennsylvania - RTK (Right to Know) List
U.S. - Rhode Island - Air Toxics - Acceptable Ambient Levels - 24-Hour
U.S. - Rhode Island - Water Quality Standards - Acute Freshwater Aquatic Life Criteria
U.S. - Rhode Island - Water Quality Standards - Chronic Freshwater Aquatic Life Criteria
U.S. - Rhode Island - Water Quality Standards - Human Health Criteria for Consumption of Aquatic Organisms Only
U.S. - Rhode Island - Water Quality Standards - Human Health Criteria for Consumption of Water and Aquatic Organisms
U.S. - South Carolina - Maximum Contaminant Levels (MCLs)
U.S. - Tennessee - Occupational Exposure Limits - TWAs
U.S. - Texas - Drinking Water Standards - Maximum Contaminant Levels (MCLs)
U.S. - Texas - Effects Screening Levels - Long Term
U.S. - Texas - Effects Screening Levels - Short Term
U.S. - Utah - Drinking Water - Maximum Contaminant Levels (MCLs)
U.S. - Vermont - Hazardous Waste - Hazardous Constituents
U.S. - Vermont - Permissible Exposure Limits - TWAs
U.S. - Virginia - Water Quality Standards - Public Water Supply Effluent Limits
U.S. - Virginia - Water Quality Standards - Surface Waters Not Used for the Public Water Supply Effluent Limits

U.S. - Washington - Dangerous Waste - Dangerous Waste Constituents List
U.S. - Washington - Permissible Exposure Limits - STELs
U.S. - Washington - Permissible Exposure Limits - TWAs
U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights 25 Feet to Less Than 40 Feet
U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights 40 Feet to Less Than 75 Feet
U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights 75 Feet or Greater
U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights Less Than 25 Feet

SECTION 16: OTHER INFORMATION

Revision date : 02/12/2014

Other Information : This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200.

GHS Full Text Phrases:

Acute Tox. 3 (Oral)	Acute toxicity (oral) Category 3
Acute Tox. 4 (Inhalation)	Acute toxicity (inhalation) Category 4
Acute Tox. 4 (Inhalation:dust,mist)	Acute toxicity (inhalation:dust,mist) Category 4
Aquatic Acute 2	Hazardous to the aquatic environment - Acute Hazard Category 2
Aquatic Chronic 2	Hazardous to the aquatic environment - Chronic Hazard Category 2
Carc. 2	Carcinogenicity Category 2
Comb. Dust	Combustible Dust
	May form combustible dust concentrations in air
H301	Toxic if swallowed
H332	Harmful if inhaled
H351	Suspected of causing cancer
H401	Toxic to aquatic life
H411	Toxic to aquatic life with long lasting effects

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

SDS US (GHS HazCom) - US

SAFETY DATA SHEET

Version 5.3
Revision Date 06/25/2015
Print Date 05/11/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : AROCLOR 1260

Product Number : CRM48736
Brand : Supelco

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Carcinogenicity (Category 1B), H350

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H350 May cause cancer.

Precautionary statement(s)
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P405 Store locked up.
P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.2 Mixtures

Hazardous components

Component		Classification	Concentration
Distillates (petroleum), hydrotreated middle			
CAS-No. EC-No. Index-No.	64742-46-7 265-148-2 649-221-00-X	Carc. 1B; H350	>= 90 - <= 100 %
Baseoil - unspecified			
CAS-No. EC-No. Index-No.	64742-53-6 265-156-6 649-466-00-2	Carc. 1B; H350	>= 30 - < 50 %
2,6-di-tert-Butyl-p-cresol			
CAS-No. EC-No.	128-37-0 204-881-4	Aquatic Acute 1; Aquatic Chronic 1; H410	>= 0.1 - < 1 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Nature of decomposition products not known.

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Distillates (petroleum), hydrotreated middle	64742-46-7	TWA	500.000000 ppm 2,000.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	Remarks	The value in mg/m3 is approximate.		

		TWA	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	5.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	10.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	5 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	5 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	5 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	10 mg/m3	USA. NIOSH Recommended Exposure Limits
Baseoil - unspecified	64742-53-6	TWA	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	5.000000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Upper Respiratory Tract irritation Not classifiable as a human carcinogen		
		TWA	5.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	10.000000 mg/m3	USA. NIOSH Recommended Exposure Limits

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC:	3 - Group 3: Not classifiable as to its carcinogenicity to humans (2,6-di-tert-Butyl-p-cresol)
IARC:	3 - Group 3: Not classifiable as to its carcinogenicity to humans (Distillates (petroleum), hydrotreated middle)
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: Not available

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Nerves. - (Aroclor 1260)

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
Not dangerous goods

IMDG
Not dangerous goods

IATA
Not dangerous goods

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Distillates (petroleum), hydrotreated middle	64742-46-7	1989-08-11
Baseoil - unspecified	64742-53-6	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Distillates (petroleum), hydrotreated middle	64742-46-7	1989-08-11
Baseoil - unspecified	64742-53-6	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Distillates (petroleum), hydrotreated middle	64742-46-7	1989-08-11
Baseoil - unspecified	64742-53-6	1993-04-24

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No.	Revision Date
Aroclor 1260	11096-82-5	2008-08-01
Distillates (petroleum), hydrotreated middle	64742-46-7	2013-12-20

WARNING: This product contains a chemical known to the	CAS-No.	Revision Date

State of California to cause birth defects or other reproductive harm. Aroclor 1260	11096-82-5	2008-08-01

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
H350	May cause cancer.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	0
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	0
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.3 Revision Date: 06/25/2015 Print Date: 05/11/2016

SAFETY DATA SHEET

Version 6.10
Revision Date 09/08/2024
Print Date 09/09/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Barium

Product Number : 403334
Brand : Aldrich
CAS-No. : 7440-39-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable solids (Category 1), H228
Chemicals which, in contact with water, emit flammable gases (Category 1), H260
Acute toxicity, Oral (Category 3), H301
Skin corrosion (Category 1B), H314

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Serious eye damage (Category 1), H318

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal Word Danger

Hazard Statements

H228	Flammable solid.
H260	In contact with water releases flammable gases which may ignite spontaneously.
H301	Toxic if swallowed.
H314	Causes severe skin burns and eye damage.

Precautionary Statements

P210	Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P223	Do not allow contact with water.
P231 + P232	Handle under inert gas. Protect from moisture.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P260	Do not breathe dust.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER/ doctor. Rinse mouth.
P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/ doctor.
P335 + P334	Brush off loose particles from skin. Immerse in cool water/ wrap in wet bandages.
P363	Wash contaminated clothing before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P402 + P404	Store in a dry place. Store in a closed container.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

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SECTION 3: Composition/information on ingredients

3.1 Substances

Formula : Ba
Molecular weight : 137.33 g/mol
CAS-No. : 7440-39-3
EC-No. : 231-149-1

Component	Classification	Concentration
barium		
	Flam. Sol. 1; 1; Acute Tox. 3; Skin Corr. 1B; Eye Dam. 1; H228, H260, H301, H314, H318	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
First aiders need to protect themselves. Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Call in physician.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Call a physician immediately.

In case of eye contact
After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist. Remove contact lenses.

If swallowed
If swallowed: give water to drink (two glasses at most). Seek medical advice immediately. In exceptional cases only, if medical care is not available within one hour, induce vomiting (only in persons who are wide awake and fully conscious), administer activated charcoal (20 - 40 g in a 10% slurry) and consult a doctor as quickly as possible. Do not attempt to neutralise.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

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SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Carbon dioxide (CO2) Dry powder

Unsuitable extinguishing media
Water Foam

5.2 Special hazards arising from the substance or mixture

Barium oxide
Combustible.
May not get in touch with: Water
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information

Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Avoid inhalation of dusts. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains. Risk of explosion.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully. Dispose of properly. Clean up affected area. Avoid generation of dusts.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Keep workplace dry. Do not allow product to come into contact with water.

Advice on protection against fire and explosion
Keep away from open flames, hot surfaces and sources of ignition.Take precautionary measures against static discharge.

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Hygiene measures
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Keep away from heat and sources of ignition. Keep locked up or in an area accessible only to qualified or authorized persons.
Never allow product to get in contact with water during storage.

Store under inert gas.

Storage class
Storage class (TRGS 510): 4.3: Hazardous materials, which set free flammable gases upon contact with water

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
barium	7440-39-3	TWA	0.5 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	0.5 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Not classifiable as a human carcinogen		
		TWA	0.5 mg/m3	USA. NIOSH Recommended Exposure Limits
		PEL	0.5 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

8.2 Exposure controls

Appropriate engineering controls
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Tightly fitting safety goggles

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Skin protection
Handle with impervious gloves.

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

Body Protection
Flame retardant antistatic protective clothing.

Respiratory protection
Recommended Filter type: Filter type P3
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when dusts are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains. Risk of explosion.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: Pieces Color: gray
b)	Odor	No data available
c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/ range: 725 °C (1337 °F) - lit.
f)	Initial boiling point and boiling range	1,640 °C 2,984 °F - lit.

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g)	Flash point	()Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	The substance or mixture is a flammable solid with the category 1.
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Density	3.6 g/mL at 25 °C (77 °F) - lit.
	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	Not applicable for inorganic substances
p)	Autoignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	none

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
The following applies in general to flammable organic substances and mixtures: in correspondingly fine distribution, when whirled up a dust explosion potential may generally be assumed.

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Heat.
Moisture.

10.5 Incompatible materials
Oxidizing agents, Water, acids, Oxygen, Chlorinated solvents, Carbon dioxide (CO2), Halogens, Halogenated hydrocarbon, Alcohols, Sulfur compounds, Hydrogen sulfide gas

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10.6 Hazardous decomposition products

In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
Oral: No data available
Inhalation: No data available
Dermal: No data available

Skin corrosion/irritation
Remarks: Causes severe burns.
(ECHA)

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
Test Type: In vitro mammalian cell gene mutation test
Test system: mouse lymphoma cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
Result: negative
Test Type: Chromosome aberration test in vitro
Test system: Chinese hamster ovary cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 473
Result: negative
Test Type: Ames test
Test system: S. typhimurium
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

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Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

RTECS: CQ8370000
Stomach/intestinal disorders, Nausea, Vomiting, Drowsiness, Dizziness, Gastrointestinal disturbance, Weakness, Tremors, Seizures.
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	static test LC50 - Danio rerio (zebra fish) - > 3.5 mg/l - 96 h (OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	static test EC50 - Daphnia magna (Water flea) - 14.5 mg/l - 48 h Remarks: (ECHA)
Toxicity to algae	Growth inhibition ErC50 - Pseudokirchneriella subcapitata (green algae) - > 1.15 mg/l - 72 h (OECD Test Guideline 201)
Toxicity to bacteria	static test EC50 - activated sludge - > 1,000 mg/l - 3 h (OECD Test Guideline 209)
Toxicity to fish(Chronic toxicity)	semi-static test NOEC - Danio rerio (zebra fish) - >= 1.26 mg/l - 33 d (OECD Test Guideline 210)
Toxicity to daphnia and other aquatic invertebrates(Chronic toxicity)	semi-static test NOEC - Daphnia magna (Water flea) - 4.4 mg/l - 21 d Remarks: (ECHA)

12.2 Persistence and degradability
The methods for determining the biological degradability are not applicable to inorganic substances.

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties
No data available

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12.7 Other adverse effects

Biological effects:
Product reacts with water.
Hazardous decomposition products
Harmful effect due to pH shift.
Discharge into the environment must be avoided.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)
UN number: 1400 Class: 4.3 Packing group: II
Proper shipping name: Barium
Reportable Quantity (RQ): 1000 lbs
Poison Inhalation Hazard: No

IMDG
UN number: 1400 Class: 4.3 Packing group: II EMS-No: F-G, S-O
Proper shipping name: BARIUM

IATA
UN number: 1400 Class: 4.3 Packing group: II
Proper shipping name: Barium

SECTION 15: Regulatory information

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
barium	7440-39-3	1000	1000 (D005)

SARA 304 Extremely Hazardous Substances Reportable Quantity
This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity
This material does not contain any components with a section 302 EHS TPQ.

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SARA 311/312 Hazards : Reactivity Hazard

SARA 313 : The following components are subject to reporting levels established by SARA Title III, Section 313:

barium	7440-39-3	>= 90 - <= 100 %

US State Regulations

Massachusetts Right To Know

barium	7440-39-3

Pennsylvania Right To Know

barium	7440-39-3

Maine Chemicals of High Concern

Product does not contain any listed chemicals

Vermont Chemicals of High Concern

Product does not contain any listed chemicals

Washington Chemicals of High Concern

Product does not contain any listed chemicals

The ingredients of this product are reported in the following inventories:

TSCA : All substances listed as active on the TSCA inventory

TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.10 Revision Date: 09/08/2024 Print Date: 09/09/2024

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SAFETY DATA SHEET

Benzene

Section 1. Identification

GHS product identifier : Benzene

Chemical name : benzene

Other means of identification : benzene, purebenzol; cyclohexatriene; phenyl hydride; phene; coal naphtha; pyrobenzol

Product use : Synthetic/Analytical chemistry.

Synonym : benzene, purebenzol; cyclohexatriene; phenyl hydride; phene; coal naphtha; pyrobenzol

SDS # : 001062

Supplier's details : Airgas USA, LLC and its affiliates
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253

Emergency telephone number (with hours of operation) : 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : FLAMMABLE LIQUIDS - Category 2
SKIN CORROSION/IRRITATION - Category 2
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2
GERM CELL MUTAGENICITY - Category 1B
CARCINOGENICITY - Category 1
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (bone marrow) - Category 1

GHS label elements

Hazard pictograms :

Signal word : Danger

Hazard statements : Highly flammable liquid and vapor.
May form explosive mixtures with air.
Causes serious eye irritation.
Causes skin irritation.
May cause genetic defects.
May cause cancer.
Causes damage to organs through prolonged or repeated exposure. (bone marrow)

Precautionary statements

General : Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand.

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Section 2. Hazards identification

Prevention : Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required. Wear protective gloves. Wear eye or face protection. Keep away from heat, sparks, open flames and hot surfaces. - No smoking. Use explosion-proof electrical, ventilating, lighting and all material-handling equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Keep container tightly closed. Do not breathe vapor. Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling.

Response : Get medical attention if you feel unwell. IF exposed or concerned: Get medical attention. IF SWALLOWED: Call a POISON CENTER or physician if you feel unwell. Rinse mouth. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing. If skin irritation occurs: Get medical attention. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical attention.

Storage : Store locked up. Store in a well-ventilated place. Keep cool.

Disposal : Dispose of contents and container in accordance with all local, regional, national and international regulations.

Hazards not otherwise classified : None known.

Section 3. Composition/information on ingredients

Substance/mixture : Substance

Chemical name : benzene

Other means of identification : benzene, purebenzol; cyclohexatriene; phenyl hydride; phene; coal naphtha; pyrobenzol

CAS number/other identifiers

CAS number : 71-43-2

Product code : 001062

Ingredient name	%	CAS number
benzene	100	71-43-2

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

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Section 4. First aid measures

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Get medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention. If necessary, call a poison center or physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Causes serious eye irritation.

Inhalation : No known significant effects or critical hazards.

Skin contact : Causes skin irritation.

Frostbite : Try to warm up the frozen tissues and seek medical attention.

Ingestion : Harmful if swallowed. Irritating to mouth, throat and stomach.

Over-exposure signs/symptoms

Eye contact : Adverse symptoms may include the following:
pain or irritation
watering
redness

Inhalation : No specific data.

Skin contact : Adverse symptoms may include the following:
irritation
redness

Ingestion : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments : No specific treatment.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

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Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use dry chemical, CO_2, water spray (fog) or foam.

Unsuitable extinguishing media : Do not use water jet.

Specific hazards arising from the chemical : Highly flammable liquid and vapor. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. The vapor/gas is heavier than air and will spread along the ground. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back. Runoff to sewer may create fire or explosion hazard.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Large spill : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

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Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Take precautionary measures against electrostatic discharges. Empty containers retain product residue and can be hazardous. Do not reuse container.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
benzene	**ACGIH TLV (United States, 3/2012).** **Absorbed through skin.** STEL: 8 mg/m³ 15 minutes. STEL: 2.5 ppm 15 minutes. TWA: 1.6 mg/m³ 8 hours. TWA: 0.5 ppm 8 hours. **NIOSH REL (United States, 1/2013).** STEL: 1 ppm 15 minutes. TWA: 0.1 ppm 10 hours. **OSHA PEL (United States, 6/2010).** STEL: 5 ppm 15 minutes. TWA: 1 ppm 8 hours. **OSHA PEL 1989 (United States, 3/1989).** STEL: 5 ppm 15 minutes. TWA: 1 ppm 8 hours. **OSHA PEL Z2 (United States, 11/2006).** AMP: 50 ppm 10 minutes. CEIL: 25 ppm TWA: 10 ppm 8 hours.

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Section 8. Exposure controls/personal protection

Appropriate engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. When there is a risk of ignition from static electricity, wear anti-static protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state : Liquid. [Watery liquid.]

Color : Colorless. Yellowish.

Molecular weight : 78.12 g/mole

Molecular formula : C6-H6

Boiling/condensation point : 80.09°C (176.2°F)

Melting/freezing point : 5.49°C (41.9°F)

Critical temperature : 288.95°C (552.1°F)

Odor : Characteristic.

Odor threshold : Not available.

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Section 9. Physical and chemical properties

pH	:	Not available.
Flash point	:	Closed cup: -11°C (12.2°F)
Burning time	:	Not applicable.
Burning rate	:	Not applicable.
Evaporation rate	:	3.5 (butyl acetate = 1)
Flammability (solid, gas)	:	Not available.
Lower and upper explosive (flammable) limits	:	Lower: 1.2% Upper: 7.8%
Vapor pressure	:	10 kPa (75.006094245 mm Hg) [room temperature]
Vapor density	:	2.7 (Air = 1)
Specific Volume (ft^3/lb)	:	1.1403
Gas Density (lb/ft^3)	:	0.877 (20°C / 68 to °F)
Relative density	:	0.88
Solubility	:	Not available.
Solubility in water	:	1.88 g/l
Partition coefficient: n-octanol/water	:	2.13
Auto-ignition temperature	:	498°C (928.4°F)
Decomposition temperature	:	Not available.
SADT	:	Not available.
Viscosity	:	Dynamic (room temperature): 0.604 mPa·s (0.604 cP)

Section 10. Stability and reactivity

Reactivity	:	No specific test data related to reactivity available for this product or its ingredients.
Chemical stability	:	The product is stable.
Possibility of hazardous reactions	:	Under normal conditions of storage and use, hazardous reactions will not occur.
Conditions to avoid	:	Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow vapor to accumulate in low or confined areas.
Incompatibility with various substances	:	Highly reactive or incompatible with the following materials: oxidizing materials.
Hazardous decomposition products	:	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Hazardous polymerization	:	Under normal conditions of storage and use, hazardous polymerization will not occur.

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Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
benzene	LC50 Inhalation Gas. LD50 Oral	Rat Rat	10000 ppm 930 mg/kg	7 hours -

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
benzene	Eyes - Moderate irritant Eyes - Severe irritant Skin - Mild irritant Skin - Mild irritant Skin - Moderate irritant	Rabbit Rabbit Rat Rabbit Rabbit	- - - - -	88 milligrams 24 hours 2 milligrams 8 hours 60 microliters 24 hours 15 milligrams 24 hours 20 milligrams	- - - - -

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Classification

Product/ingredient name	OSHA	IARC	NTP
benzene	+	1	Known to be a human carcinogen.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Name	Category	Route of exposure	Target organs
benzene	Category 1	Not determined	bone marrow

Aspiration hazard

Not available.

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : Causes serious eye irritation.

Inhalation : No known significant effects or critical hazards.

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Section 11. Toxicological information

Skin contact : Causes skin irritation.

Ingestion : Harmful if swallowed. Irritating to mouth, throat and stomach.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : Adverse symptoms may include the following:
pain or irritation
watering
redness

Inhalation : No specific data.

Skin contact : Adverse symptoms may include the following:
irritation
redness

Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : Causes damage to organs through prolonged or repeated exposure.

Carcinogenicity : May cause cancer. Risk of cancer depends on duration and level of exposure.

Mutagenicity : May cause genetic defects.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

Bioaccumulative potential

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Section 12. Ecological information

Product/ingredient name	$LogP_{ow}$	BCF	Potential
benzene	2.13	11	low

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

United States - RCRA Toxic hazardous waste "U" List

Ingredient	CAS #	Status	Reference number
Benzene (I,T)	71-43-2	Listed	U019

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN1114	UN1114	UN114	UN1114	UN1114
UN proper shipping name	BENZENE	BENZENE	BENZENE	BENZENE	BENZENE
Transport hazard class(es)	3	3	3	3	3
Packing group	II	II	II	II	II
Environment	No.	No.	No.	No.	No.
Additional information	**Reportable quantity** 10 lbs / 4.54 kg [1.3675 gal / 5.1767 L] Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.	**Explosive Limit and Limited Quantity Index** 1 **Passenger Carrying Road or Rail Index** 5	-	-	**Passenger and Cargo Aircraft**Quantity limitation: 5 L **Cargo Aircraft Only** Quantity limitation: 60 L **Limited Quantities - Passenger Aircraft** Quantity limitation: 1 L

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Section 14. Transport information

	Limited quantity Yes. **Packaging instruction** **Passenger aircraft** Quantity limitation: 5 L **Cargo aircraft** Quantity limitation: 60 L **Special provisions** IB2, T4, TP1				

"Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product."

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption**: Not determined

United States inventory (TSCA 8b): This material is listed or exempted.

Clean Water Act (CWA) 307: benzene

Clean Water Act (CWA) 311: benzene

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Fire hazard
Immediate (acute) health hazard
Delayed (chronic) health hazard

Composition/information on ingredients

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Section 15. Regulatory information

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
benzene	100	Yes.	No.	No.	Yes.	Yes.

SARA 313

	Product name	CAS number	%
Form R - Reporting requirements	benzene	71-43-2	100
Supplier notification	benzene	71-43-2	100

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

State regulations

Massachusetts : This material is listed.

New York : This material is listed.

New Jersey : This material is listed.

Pennsylvania : This material is listed.

California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
benzene	Yes.	Yes.	6.4 µg/day (ingestion) 13 µg/day (inhalation)	24 µg/day (ingestion) 49 µg/day (inhalation)

Canada inventory : This material is listed or exempted.

International regulations

International lists : **Australia inventory (AICS)**: This material is listed or exempted.
China inventory (IECSC): This material is listed or exempted.
Japan inventory: This material is listed or exempted.
Korea inventory: This material is listed or exempted.
Malaysia Inventory (EHS Register): Not determined.
New Zealand Inventory of Chemicals (NZIoC): This material is listed or exempted.
Philippines inventory (PICCS): This material is listed or exempted.
Taiwan inventory (CSNN): Not determined.

Chemical Weapons Convention List Schedule I Chemicals : Not listed

Chemical Weapons Convention List Schedule II Chemicals : Not listed

Chemical Weapons Convention List Schedule III Chemicals : Not listed

Canada

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Section 15. Regulatory information

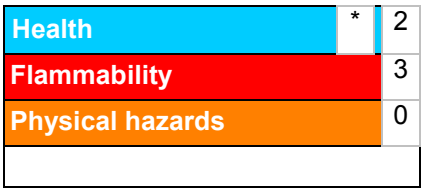
WHMIS (Canada) : Class B-2: Flammable liquid
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

CEPA Toxic substances: This material is listed.
Canadian ARET: This material is not listed.
Canadian NPRI: This material is listed.
Alberta Designated Substances: This material is not listed.
Ontario Designated Substances: This material is not listed.
Quebec Designated Substances: This material is not listed.

Section 16. Other information

Canada Label requirements : Class B-2: Flammable liquid
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

Hazardous Material Information System (U.S.A.)



Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on SDSs under 29 CFR 1910. 1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)

Reprinted with permission from NFPA 704-2001, Identification of the Hazards of Materials for Emergency Response Copyright ©1997, National Fire Protection Association, Quincy, MA 02269. This reprinted material is not the complete and official position of the National Fire Protection Association, on the referenced subject which is represented only by the standard in its entirety.

Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

History

Date of printing : 4/26/2015.

Date of issue/Date of revision : 4/26/2015.

Date of previous issue : 10/16/2014.

Version : 0.03

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Section 16. Other information

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United NationsACGIH – American Conference of Governmental Industrial Hygienists
AIHA – American Industrial Hygiene Association
CAS – Chemical Abstract Services
CEPA – Canadian Environmental Protection Act
CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act (EPA)
CFR – United States Code of Federal Regulations
CPR – Controlled Products Regulations
DSL – Domestic Substances List
GWP – Global Warming Potential
IARC – International Agency for Research on Cancer
ICAO – International Civil Aviation Organisation
Inh – Inhalation
LC – Lethal concentration
LD – Lethal dosage
NDSL – Non-Domestic Substances List
NIOSH – National Institute for Occupational Safety and Health
TDG – Canadian Transportation of Dangerous Goods Act and Regulations
TLV – Threshold Limit Value
TSCA – Toxic Substances Control Act
WEEL – Workplace Environmental Exposure Level
WHMIS – Canadian Workplace Hazardous Material Information System

References : Not available.

Indicates information that has changed from previously issued version.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

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SAFETY DATA SHEET

Based on Directive 2001/58/EC et seq. of the Commission of the European Communities

BENZO[b]FLUORANTHENE

1. Identification of the substance/preparation and of the company/undertaking

1.1 Identification of the substance or preparation:

Synonyms: benz[e]acephenanthrylene

CAS No.	: 205-99-2	**BCR number**	: BCR-47
EC index No.	: 601-034-00-4	**NFPA code**	: N.D.
EINECS No.	: 205-911-9	**Molecular weight**	: 252.32
RTECS No.	: CU1400000	**Formula**	: $C_{20}H_{12}$

1.2 Use of the substance or the preparation:
Certified reference material for laboratory use only

1.3 Company/undertaking identification:
Institute for Reference Materials and Measurements
Retieseweg
B-2440 Geel
Tel. : +32 14 57 12 11
Fax : +32 14 58 42 73

1.4 Telephone number for emergency:
+32 70 245 245
Antigifcentrum
p/a Militair Hospitaal Koningin Astrid, Bruynstraat, B-1120 Brussel

2. Composition/information on ingredients

Hazardous ingredients	CAS No. EINECS No.	Conc. in %	Hazard symbol	Risks (R-phrases)
benzo[b]fluoranthene	205-99-2 205-911-9	100	T;N	45-50/53 (1)

(1) For R-phrases in full: see heading 16

3. Hazards identification

- May cause cancer
- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

4. First aid measures

4.1 Eye contact:
- Consult a doctor/medical service if irritation persists
- Rinse immediately with water
- Do not apply neutralizing agents

4.2 Skin contact:
- Consult a doctor/medical service if irritation persists
- Wash with water and soap
- Remove clothing before washing
-- Do not apply (chemical) neutralizing agents

4.3 After inhalation:
- Consult a doctor/medical service if breathing problems develop
- Remove the victim into fresh air
- Unconscious: maintain adequate airway and respiration

4.4 After ingestion:
- Consult a doctor/medical service if you feel unwell

- Immediately give lots of water to drink
-- Never give water to an unconscious person
- Do not induce vomiting

5. Fire-fighting measures

5.1 Suitable extinguishing media:
- Water spray
- Polymer foam
- ABC powder
- Carbon dioxide

5.2 Unsuitable extinguishing media:
- Solid water jet ineffective as extinguishing medium

5.3 Special exposure hazards:
- Not easily combustible
- Upon combustion CO and CO2 are formed

5.4 Instructions:
- Take account of toxic firefighting water
- Use firefighting water moderately and contain it

5.5 Special protective equipment for firefighters:
- Heat/fire exposure: compressed air/oxygen apparatus
- Dust cloud production: compressed air/oxygen apparatus

6. Accidental release measures

6.1 Personal protection/precautions: see 8.1/8.3/10.3

6.2 Environmental precautions:
- Prevent soil and water pollution
- Substance must not be discharged into the sewer
- Dam up the solid spill

6.3 Methods for cleaning up:
- Stop dust cloud by covering with sand/earth
- Carefully collect the spill/leftovers
- Scoop solid spill into closing containers
- Take collected spill to manufacturer/competent authority
- Clean contaminated surfaces with an excess of water
- Wash clothing and equipment after handling

7. Handling and storage

7.1 Handling:
- Observe strict hygiene
- Avoid prolonged and repeated contact with skin
- Avoid raising dust
- Do not discharge the waste into the drain
- Clean contaminated clothing

7.2 Storage:
- Keep container tightly closed.
- Store in a cool area
- Store in a dry area
- Store in a dark area
- Keep away from: heat sources, ignition sources, oxidizing agents, acids

Storage temperature : N.D. **°C**
Quantity limits : N.D. **kg**
Storage life : N.D.
Materials for packaging : N.D.

7.3 Specific uses: N.D.

8. Exposure controls/Personal protection

8.1 Exposure limit values:

TLV-TWA	:	not listed
TLV-STEL	:	not listed
TLV-Ceiling	:	not listed
OES-LTEL	:	not listed
OES-STEL	:	not listed
MEL-LTEL	:	not listed
MEL-STEL	:	not listed
MAK	:	not listed
TRK	:	not listed
MAC-TGG 8 h	:	not listed
MAC-TGG 15 min.	:	not listed
MAC-Ceiling	:	not listed
VME-8 h	:	not listed
VLE-15 min.	:	not listed
GWBB-8 h	:	not listed
GWK-15 min.	:	not listed
Momentary value	:	not listed

Sampling methods:

- Benzo(b)fluoranthene (Polynuclear aromatic hydrocarbons) NIOSH 5515
- Benzo(b)fluoranthene (Polynuclear aromatic hydrocarbons) NIOSH 5506

8.2 Exposure controls:

8.2.1 Occupational exposure controls:
- Measure the concentration in the air regularly
- Work under local exhaust/ventilation

8.2.2 Environmental exposure controls: see 13

8.3 Personal protection:

8.3.1 respiratory protection:
- Dust production: dust mask with filter type P3
- High dust production: compressed air/oxygen apparatus

8.3.2 hand protection:
- Gloves
  Suitable materials: No data available

- Breakthrough time: N.D.

8.3.3 eye protection:
- Safety glasses
- In case of dust production: protective goggles

8.3.4 skin protection:
- Protective clothing
- In case of dust production: head/neck protection
  Suitable materials: No data available

9. Physical and chemical properties

9.1 General information:

Appearance (at 20°C)	:	Crystalline solid / Needles
Odour	:	Odourless
Colour	:	Colourless to off-white

9.2 Important health, safety and environmental information:

pH value	:	N.D.	
Boiling point/boiling range	:	N.D.	**°C**
Flashpoint	:	N.D.	**°C**
Explosion limits	:	N.D.	**vol%** (**°C**)
Vapour pressure (at 20°C)	:	0.00000067	**hPa**
Vapour pressure (at 50°C)	:	N.D.	**hPa**
Relative density (at 20°C)	:	N.D.	
Water solubility	:	0.00000012	**g/100 ml**
Soluble in	:	Acetone, oils/fats	
Relative vapour density	:	N.D.	
Viscosity	:	N.D.	**Pa.s**
Partition coëfficient n-octanol/water	:	6.57	
Evaporation rate			
ratio butyl acetate	:	N.D.	
ratio ether	:	N.D.	

9.3 Other information:

Melting point/melting range	:	168	**°C**
Auto-ignition point	:	N.D.	**°C**
Saturation concentration	:	N.D.	**g/m^3**

10. Stability and reactivity

10.1 Conditions to avoid/reactivity:
- Stable under normal conditions

10.2 Materials to avoid:
- Keep away from: heat sources, ignition sources, oxidizing agents, acids

10.3 Hazardous decomposition products:
- Upon combustion CO and CO2 are formed
- Reacts violently with (strong) oxidizers
- Decomposes on exposure to (strong) acids

11. Toxicological information

11.1 Acute toxicity:

LD50 oral rat	:	N.D.	**mg/kg**
LD50 dermal rat	:	N.D.	**mg/kg**
LD50 dermal rabbit	:	N.D.	**mg/kg**
LC50 inhalation rat	:	N.D.	**mg/l/4 h**
LC50 inhalation rat	:	N.D.	**ppm/4 h**

11.2 Chronic toxicity:

benzo[b]fluoranthene

EC carc. cat.	:	2
EC muta. cat.	:	not listed
EC repr. cat.	:	not listed
Carcinogenicity (TLV)	:	A2
Carcinogenicity (MAC)	:	K
Carcinogenicity (VME)	:	not listed
Carcinogenicity (GWBB)	:	not listed
Carcinogenicity (MAK)	:	2
Mutagenicity (MAK)	:	not listed
Teratogenicity (MAK)	:	-
IARC classification	:	2B

11.3 Routes of exposure: ingestion, inhalation, eyes and skin
Caution! Substance is absorbed through the skin

11.4 Acute effects/symptoms:

- **AFTER SKIN CONTACT**
  Slight irritation

11.5 Chronic effects:

- Probably human carcinogenic
- Not classified as toxic to reproduction (EC)

- **ON CONTINUOUS/REPEATED EXPOSURE/CONTACT:**
  No specific information available

- SIMILAR PRODUCTS CAUSE FOLLOWING SYMPTOMS:
  Feeling of weakness
  Cracking of the skin
  Skin rash/inflammation
  Photoallergy
  Skin cancer
  Lung tissue affection/degeneration
  Enlargement/affection of the liver
  Affection of the renal tissue

12. Ecological information

12.1 Ecotoxicity:

- - No data available

12.2 Mobility:

- **Volatile organic compounds (VOC):** 0%

- Photolysis in water
- Forming sediments in water
- Insoluble in water

For other physicochemical properties see heading 9.

12.3 Persistence and degradability:

- **biodegradation BOD_5** : N.D. **% ThOD**
- **water** : - Not readily biodegradable in water
  - test: E 1/2 > 100 d.
- **soil** : **T ½:** > 87 **days**

12.4 Bioaccumulative potential:

- **log P_{ow}** : 6.57
- **BCF** : 168 h : 2800 (LAMELLIBRANCHIATA)
- Highly bioaccumulative

12.5 Other adverse effects:

- **WGK** : 3 (Classification based on the R-phrases in compliance with Verwaltungsvorschrift wassergefährdender Stoffe (VwVwS) of 17 May 1999)
- **Effect on the ozone layer** : Not dangerous for the ozone layer (Council Regulation (EC) No 3093/94, O.J. L333 of 22/12/94)
- **Greenhouse effect** : no data available
- **Effect on waste water purification** : no data available

13. Disposal considerations

13.1 Provisions relating to waste:

- Waste material code (91/689/EEC, Council Decision 201/118/EC, O.J. L47 of 16/2/2001):16 05 06 (laboratory chemicals, consisting of or containing dangerous substances, including mixtures of laboratory)
- Waste material code (Flanders): 001, 045, 691
- Waste code (Germany): 59302
- Hazardous waste (91/689/EEC)

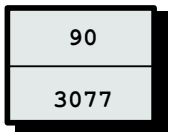
13.2 Disposal methods:

- Dissolve or mix with a combustible solvent
- Remove to an authorized incinerator equipped with an afterburner and a flue gas scrubber
- Do not discharge into surface water (2000/60/EEC, Council Decision 2455/2001/EC, O.J. L331 of 15/12/2001)

13.3 Packaging/Container:

- Waste material code packaging (91/689/EEC, Council Decision 2001/118/EC, O.J. L47 of 16/2/2001): 15 01 10 (packaging containing residues of or contaminated by dangerous substances)

14. Transport information



14.1 Classification of the substance in compliance with UN Recommendations

UN number	: 3077
CLASS	: 9
SUB RISKS	: -
PACKING	: III
PROPER SHIPPING NAME	: UN 3077, Environmentally hazardous substance, solid, n.o.s. (benz[e]acephenanthrylene)

14.2 ADR (transport by road)

CLASS	: 9
PACKING	: III
DANGER LABEL TANKS	: 9
DANGER LABEL PACKAGES	: 9

14.3 RID (transport by rail)

CLASS	: 9
PACKING	: III
DANGER LABEL TANKS	: 9
DANGER LABEL PACKAGES	: 9

14.4 ADNR (transport by inland waterways)

CLASS	: 9
PACKING	: III
DANGER LABEL TANKS	: 9
DANGER LABEL PACKAGES	: 9

14.5 IMDG (maritime transport)

CLASS	: 9
SUB RISKS	: -
PACKING	: III
MFAG	: -
EMS	: -
MARINE POLLUTANT	: P

14.6 ICAO (air transport)

CLASS	: 9
SUB RISKS	: -
PACKING	: III
PACKING INSTRUCTIONS PASSENGER AIRCRAFT	:
PACKING INSTRUCTIONS CARGO AIRCRAFT	:

14.7 Special precautions in connection with transport : none

When substances and their packaging meet the conditions established by ADR/RID/ADNR in chapter 3.4, **only** the following prescriptions shall be complied with:
each package shall display a diamond-shaped figure with the following inscription:
- 'UN 3077'
or, in the case of different goods with different identification numbers within a single package:
- the letters 'LQ'

15. Regulatory information

Enumerated in substance list Annex I of directive 67/548/EEC et sequens

Toxic

Dangerous for the environment

R45 : May cause cancer
R50/53 : Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

S53 : Avoid exposure - obtain special instructions before use
S45 : In case of accident or if you feel unwell, seek medical advice (show the label where possible)
S60 : This material and/or its container must be disposed of as hazardous waste
S61 : Avoid release to the environment. Refer to special instructions/safety data sheets.

16. Other information

The information provided on this MSDS is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

N.A. = NOT APPLICABLE
N.D. = NOT DETERMINED
***** = INTERNAL CLASSIFICATION

Full text of any R-phrases referred to under heading 2:

R45 : May cause cancer
R50/53 : Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

Exposure limits:
TLV : Threshold Limit Value - ACGIH USA 2000
OES : Occupational Exposure Standards - United Kingdom 1999
MEL : Maximum Exposure Limits - United Kingdom 1999
MAK : Maximale Arbeitsplatzkonzentrationen - Germany 2001
TRK : Technische Richtkonzentrationen - Germany 2001
MAC : Maximale aanvaarde concentratie - The Netherlands 2002
VME : Valeurs limites de Moyenne d'Exposition - France 1999
VLE : Valeurs limites d'Exposition à court terme - France 1999
GWBB : Grenswaarde beroepsmatige blootstelling - Belgium 1998
GWK : Grenswaarde kortstondige blootstelling - Belgium 1998
EC : Indicative occupational exposure limit values - directive 2000/39/EC

Chronic toxicity:
K : List of the carcinogenic substances and processes - The Netherlands 2002

Institute for Reference Materials and Measurements

SAFETY DATA SHEET

Based on Regulation (EC) No. 1907/2006 (REACH) Article 31 and Annex II

BCR-048R: benzo[k]fluoranthene

1. Identification of the substance/preparation and of the company/undertaking

1.1 Identification of the substance or preparation:

Product name: BCR-048R: benzo[k]fluoranthene

CAS number	207-08-9
EC index number	601-036-00-5
EINECS number	205-916-6
RTECS number	DF6350000
Molecular mass	252.32 g/mol
Formula	C20H12

1.2 Use of the substance/preparation:

Certified reference material for laboratory use only

1.3 Company/undertaking identification:

Institute for Reference Materials and Measurements
Retieseweg
B-2440 Geel
Tel: +32 14 57 12 11
Fax: +32 14 59 04 06
JRC-IRMM-RM-Sales@ec.europa.eu

1.4 Emergency telephone:

Poison Centre: +32 70 245 245

2. Hazards identification

NFPA: 1-1-2(*)

DSD/DPD

May cause cancer

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

Other hazards

Its dust is explosive with air

Dust cloud can be ignited by a spark

Slightly irritant to skin

Slightly irritant to eyes

Caution! Substance is absorbed through the skin

No certainty about human mutagenic properties

Highly bioaccumulative

Not readily biodegradable in water

CLP

Carc. 1B	May cause cancer. (H350)
Aquatic Acute 1	Very toxic to aquatic life. (H400)
Aquatic Chronic 1	Very toxic to aquatic life with long lasting effects. (H410)

Other hazards

Its dust is explosive with air

Dust cloud can be ignited by a spark

Slightly irritant to skin

Slightly irritant to eyes

Caution! Substance is absorbed through the skin

No certainty about human mutagenic properties

Highly bioaccumulative

Not readily biodegradable in water

3. Composition/information on ingredients

Name	CAS No EINECS/ELINCS	Conc.	Classification according to DSD/DPD	Classification according to CLP	Note
benzo[k]fluoranthene	207-08-9 205-916-6		Carc. Cat. 2; R45 N; R50-53	Carc. 1B; H350 Aquatic Acute 1; H400 Aquatic Chronic 1; H410	

4. First aid measures

4.1 After inhalation:

Remove the victim into fresh air

Respiratory problems: consult a doctor/medical service

4.2 Skin contact:

Rinse with water

Do not apply (chemical) neutralizing agents

Take victim to a doctor if irritation persists

4.3 Eye contact:

Rinse with water

Do not apply neutralizing agents

Take victim to an ophthalmologist if irritation persists

4.4 After ingestion:

Rinse mouth with water

Immediately after ingestion: give lots of water to drink

Do not induce vomiting

Consult a doctor/medical service if you feel unwell

5. Fire-fighting measures

5.1 Suitable extinguishing media:

Water spray

Polyvalent foam

ABC powder

Carbon dioxide

5.2 Unsuitable extinguishing media:

No unsuitable extinguishing media known

5.3 Special exposure hazards:

Heating increases the fire hazard

Dust cloud can be ignited by a spark

Upon combustion CO and CO2 are formed

5.4 Instructions:

Take account of toxic fire-fighting water

Use water moderately and if possible collect or contain it

5.5 Special protective equipment for fire-fighters:

Gloves

Protective clothing

Heat/fire exposure: compressed air/oxygen apparatus

6. Accidental release measures

6.1 Personal precautions:

See heading 8.2

6.2 Environmental precautions:

Dam up the solid spill

Prevent soil and water pollution

Prevent spreading in sewers

See heading 13

6.3 Methods for cleaning up:

Scoop solid spill into closing containers
Carefully collect the spill/leftovers
Clean contaminated surfaces with an excess of water
Take collected spill to manufacturer/competent authority
Wash clothing and equipment after handling

7. Handling and storage

7.1 Handling:

Avoid raising dust
Warning! Avoid exposure
Keep away from naked flames/heat
Obtain special instructions before use
Observe strict hygiene
Keep container tightly closed
Do not discharge the waste into the drain

7.2 Storage:

Safe storage requirements:

Store in a cool area
Store in a dry area
Keep container in a well-ventilated place
Keep locked up
Unauthorized persons are not admitted
Meet the legal requirements

Keep away from:

oxidizing agents
(strong) acids

7.3 Specific use(s):

See information supplied by the manufacturer for the identified use(s)

8. Exposure controls/Personal protection

8.1 Exposure limit values:

8.1.1 Occupational exposure:

If limit values are applicable and available these will be listed below.

8.1.2 Sampling methods:

Product name	Test	Number	Sampling method	Remarks
Benz(a)Anthracene	OSHA	CSI		
Benz(a)Anthracene (Polynuclear aromatic hydrocarbons)	NIOSH	5506	adsorption tubes	
Benz(a)Anthracene (Polynuclear aromatic hydrocarbons)	NIOSH	5515	adsorption tubes	

8.2 Exposure controls:

8.2.1 Occupational exposure controls:

Measure the concentration in the air regularly
Carry operations in the open/under local exhaust/ventilation or with respiratory protection
Personal protective equipment:

a) Respiratory protection:

Dust production: dust mask with filter type P3

b) Hand protection:

Gloves

c) Eye protection:

Safety glasses
In case of dust production: protective goggles

d) Skin protection:

Protective clothing

8.2.2 Environmental exposure controls:

See headings 6.2, 6.3 and 13

9. Physical and chemical properties

9.1 General information:

Physical form	Crystalline solid
	Needles
Colour	Light yellow

9.2 Important health, safety and environmental information:

Boiling point	480 °C
Vapour pressure (20°C)	< 0.00001 hPa
Solubility in water	< 0.00001 g/100 ml
Solubility in solvents	Soluble in ethanol
	Soluble in acetic acid
	Soluble in oils/fats
Log Pow	6.84

9.3 Other information:

Melting point	217 °C

10. Stability and reactivity

10.1 Conditions to avoid:

Possible fire hazard

heat sources

ignition sources

Stability

No data available

Reactions

Reacts violently with (strong) oxidizers

10.2 Materials to avoid:

oxidizing agents

(strong) acids

10.3 Hazardous decomposition products:

Upon combustion CO and CO2 are formed

11. Toxicological information

11.1 Acute toxicity:

No (test)data available.

11.2 Chronic toxicity:

Probably human carcinogenic

No certainty about human mutagenic properties

Not classified as toxic to reproduction (EC)

BCR-048R: benzo[k]fluoranthene

EC carc cat	2
Listed in SZW - List of carcinogenic substances	yes
IARC - classification	2B
MAK - Krebserzeugend Kategorie	2
MAK - Keimzellmutagen Kategorie	3B
MAK - Schwangerschaft Gruppe	-
CLP carc cat	category 1B

11.3 Acute effects/symptoms:

Inhalation:

No data available

Skin contact:

Slight irritation

Eye contact:

Slight irritation

Ingestion:

No data available

11.4 Chronic effects:

ON CONTINUOUS/REPEATED EXPOSURE/CONTACT:
No specific information available
SIMILAR PRODUCTS CAUSE FOLLOWING SYMPTOMS:
Feeling of weakness
Cracking of the skin
Skin rash/inflammation
Photoallergy
Skin cancer
Lung tissue affection/degeneration
Enlargement/affection of the liver
Affection of the renal tissue

12. Ecological information

12.1 Ecotoxicity:

No (test)data available.

12.2 Mobility:

Volatile organic compounds (VOC)	0 %
Solubility in/reaction with water	Insoluble in water
Water physicochemical processes	Forming sediments in water
Soil physicochemical processes	Adsorbs into the soil

12.3 Persistence and degradability:

Water abiotic degradation processes	Ozonation in water
Half-life soil	65 - 1400 days

Not readily biodegradable in water

12.4 Bioaccumulative potential:

Log Pow	6.84

Highly bioaccumulative

12.5 Results of PBT assessment:

Not applicable, based on available data

12.6 Other adverse effects:

Not dangerous for the ozone layer (Council Regulation (EC) no 1005/2009)

13. Disposal considerations

13.1 Provisions relating to waste:

Waste material code (Directive 2008/98/EC, decision 2001/118/EC)
16 05 06* : laboratory chemicals, consisting of or containing dangerous substances, including mixtures of laboratory chemicals
Depending on branch of industry and production process, also other EURAL codes may be applicable
Hazardous waste according to Directive 2008/98/EC

13.2 Disposal methods:

Dissolve or mix with a combustible solvent
Remove to an authorized incinerator equipped with an afterburner and a flue gas scrubber with energy recovery
Remove waste in accordance with local and/or national regulations
Do not discharge into surface water (2000/60/EC, Council decision 2455/2001/EC, O.J. L331 of 15/12/2001)

13.3 Packaging/Container:

Waste material code packaging (Directive 2008/98/EC)
15 01 10* : packaging containing residues of or contaminated by dangerous substances

{13.4 Entsorgung verschmutzter Gebinde:}

14. Transport information

ADR

Proper shipping name	Environmentally hazardous substance, solid, n.o.s.
Techn./chem. name ADR	benzo[k]fluoranthene
UN number	3077
Class	9
Packing group	III
Hazard identification number	90
Classification code	M7
Labels	9
Environmentally hazardous substance mark	yes

RID

Proper shipping name	Environmentally hazardous substance, solid, n.o.s.
Techn./chem. name RID	benzo[k]fluoranthene
UN number	3077
Class	9
Packing group	III
Classification code	M7
Labels	9
Environmentally hazardous substance mark	yes

ADNR

Proper shipping name	Environmentally hazardous substance, solid, n.o.s.
Techn./chem. name ADNR	benzo[k]fluoranthene
UN number	3077
Class	9
Packing group	III
Classification code	M7
Labels	9
Environmentally hazardous substance mark	yes

IMO

Proper shipping name	Environmentally hazardous substance, solid, n.o.s.
Techn./chem. name IMO	benzo[k]fluoranthene
UN number	3077
Class	9
Packing group	III
Labels	9
Marine pollutant	P
Environmentally hazardous substance mark	yes

ICAO

Proper shipping name	Environmentally hazardous substance, solid, n.o.s.
Techn./chem. name ICAO	benzo[k]fluoranthene
UN number	3077
Class	9
Packing group	III
Labels	9
Environmentally hazardous substance mark	yes

15. Regulatory information

15.1 EU Legislation:

DSD/DPD

Enumerated in substance list Annex I of directive 67/548/EEC et sequens

Dangerous for the environment

R-phrases

45	May cause cancer
50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

S-phrases

53	Avoid exposure - obtain special instructions before use
45	In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible)
60	This material and its container must be disposed of as hazardous waste
61	Avoid release to the environment. Refer to special instructions/safety data sheets.

Additional recommendations

	Restricted to professional users.

CLP

Classification and labelling according to Regulation (EC) No 1272/2008 – Annex VI and after evaluation of available test data

Signal word

Dgr	Danger

H-statements

H350	May cause cancer.
H410	Very toxic to aquatic life with long lasting effects.

P-statements

P202	Do not handle until all safety precautions have been read and understood.
P281	Use personal protective equipment as required.
P273	Avoid release to the environment.
P308 + P313	IF exposed or concerned: Get medical advice/attention.
P391	Collect spillage.
P405	Store locked up.

Supplemental information

	Restricted to professional users.

15.2 National provisions:

15.3 Specific community rules:

Enumerated in Annex XVII of Regulation (EC) No. 1907/2006: Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles.

Legislation	Reference legislation
EG/552/2009	See column 1: 28.
EG/552/2009	See column 1: 50. g)

16. Other information

The information in this safety data sheet is based on data and samples provided to BIG. The sheet was written to the best of our ability and according to the state of knowledge at that time. The safety data sheet only constitutes a guideline for the safe handling, use, consumption, storage, transport and disposal of the substances/preparations/mixtures mentioned under point 1. New safety data sheets are written from time to time. Only the most recent versions may be used. Old versions must be destroyed. Unless indicated otherwise word for word on the safety data sheet, the information does not apply to substances/preparations/mixtures in purer form, mixed with other substances or in processes. The safety data sheet offers no quality specification for the substances/preparations/mixtures in question.

Compliance with the instructions in this safety data sheet does not release the user from the obligation to take all measures dictated by common sense, regulations and recommendations or which are necessary and/or useful based on the real applicable circumstances. BIG does not guarantee the accuracy or exhaustiveness of the information provided. Use of this safety data sheet is subject to the licence and liability limiting conditions as stated in your BIG licence agreement. All intellectual property rights to this sheet are the property of BIG and its distribution and reproduction are limited. Consult your BIG licence agreement for details.

(*) = INTERNAL CLASSIFICATION (NFPA)

PBT-substances = persistent, bioaccumulative and toxic substances

DSD Dangerous Substance Directive
DPD Dangerous Preparation Directive
CLP (EU-GHS) Classification, labelling and packaging (Globally Harmonised System in Europe)

Full text of any R-phrases referred to under headings 2 and 3:

R45	May cause cancer
R50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

Full text of any H-statements referred to under headings 2 and 3:

H350	May cause cancer.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

Full text of any classes referred to under headings 2 and 3:

Aquatic Acute	Hazardous to the aquatic environment - acute
Aquatic Chronic	Hazardous to the aquatic environment - chronic
Carc.	Carcinogenicity

SAFETY DATA SHEET

Based on Directive 2001/58/EC et seq. of the Commission of the European Communities

BENZ[a]ANTHRACENE

1. Identification of the substance/preparation and of the company/undertaking

1.1 Identification of the substance or preparation:

Synonyms: benzo(a)anthracene

CAS No.	: 56-55-3	**BCR number**	: BCR-271
EC index No.	: 601-033-00-9	**NFPA code**	: N.D.
EINECS No.	: 200-280-6	**Molecular weight**	: 228.30
RTECS No.	: CV9275000	**Formula**	: C18H12

1.2 Use of the substance or the preparation:
Certified reference material for laboratory use only

1.3 Company/undertaking identification:
Institute for Reference Materials and Measurements
Retieseweg
B-2440 Geel
Tel. : +32 14 57 12 11
Fax : +32 14 58 42 73

1.4 Telephone number for emergency:
+32 70 245 245
Antigifcentrum
p/a Militair Hospitaal Koningin Astrid, Bruynstraat, B-1120 Brussel

2. Composition/information on ingredients

Hazardous ingredients	CAS No. EINECS No.	Conc. in %	Hazard symbol	Risks (R-phrases)
Benzo[a]anthracene	56-55-3 200-280-6	100	T;N	45-50/53 (1)

(1) For R-phrases in full: see heading 16

3. Hazards identification

- May cause cancer
- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

4. First aid measures

4.1 Eye contact:
- Consult a doctor/medical service if irritation persists
- Rinse immediately with water

4.2 Skin contact:
- Consult a doctor/medical service if irritation persists
- Wash with water and soap
- Remove clothing before washing

4.3 After inhalation:
- Consult a doctor/medical service if breathing problems develop
- Remove the victim into fresh air
- Unconscious: maintain adequate airway and respiration

4.4 After ingestion:
- Consult a doctor/medical service if you feel unwell
- Immediately give lots of water to drink
- Never give water to an unconscious person

5. Fire-fighting measures

5.1 Suitable extinguishing media:
- Water spray
- Alcohol foam
- Polymer foam
- ABC powder
- Carbon dioxide

5.2 Unsuitable extinguishing media:
- Solid water jet ineffective as extinguishing medium

5.3 Special exposure hazards:
- Not easily combustible
- Upon combustion CO and CO2 are formed

5.4 Instructions:
- Take account of toxic firefighting water
- Use firefighting water moderately and contain it

5.5 Special protective equipment for firefighters:
- Heat/fire exposure: compressed air/oxygen apparatus
- Dust cloud production: compressed air/oxygen apparatus

6. Accidental release measures

6.1 Personal protection/precautions: see heading 8.1/8.3/10.3

6.2 Environmental precautions:
- Prevent soil and water pollution
- Substance must not be discharged into the sewer
- Dam up the solid spill

6.3 Methods for cleaning up:
- Stop dust cloud by covering with sand/earth
- Carefully collect the spill/leftovers
- Scoop solid spill into closing containers
- Take collected spill to manufacturer/competent authority
- Clean contaminated surfaces with an excess of water
- Wash clothing and equipment after handling

7. Handling and storage

7.1 Handling:
- Observe strict hygiene
- Avoid prolonged and repeated contact with skin
- Avoid raising dust
- Do not discharge the waste into the drain
- Remove contaminated clothing immediately

7.2 Storage:
- Keep container tightly closed. Store in a cool area. Store in a dry area.
- Store in a dark area.
- Keep away from: heat sources, ignition sources, oxidizing agents, acids

Storage temperature : N.D. **°C**
Quantity limits : N.D. **kg**
Storage life : N.D.
Materials for packaging :
- suitable : no data available
- to avoid : no data available

7.3 Specific uses:
See information supplied by the manufacturer

8. Exposure controls/Personal protection

8.1 Exposure limit values:

TLV-TWA	:	**mg/m^3**	-	**ppm**
TLV-STEL	:	**mg/m^3**	-	**ppm**
TLV-Ceiling	:	**mg/m^3**		**ppm**
OES-LTEL	:	**mg/m^3**		**ppm**
OES-STEL	:	**mg/m^3**		**ppm**
MAK	:	**mg/m^3**		**ppm**
TRK	:	**mg/m^3**		**ppm**
MAC-TGG 8 h	:	**mg/m^3**		
MAC-TGG 15 min.	:	**mg/m^3**		
MAC-Ceiling	:	**mg/m^3**		
VME-8 h	:	**mg/m^3**		**ppm**
VLE-15 min.	:	**mg/m^3**		**ppm**
GWBB-8 h	:	**mg/m^3**		**ppm**
GWK-15 min.	:	**mg/m^3**		**ppm**
Momentary value	:	**mg/m^3**		**ppm**
EC	:	**mg/m^3**		**ppm**
EC-STEL	:	**mg/m^3**		**ppm**

Sampling methods:

- Benz(a)Anthracene (Polynuclear aromatic hydrocarbons)	NIOSH 5506
- Benz(a)Anthracene (Polynuclear aromatic hydrocarbons)	NIOSH 5515
- Benz(a)Anthracene	OSHA CSI

8.2 Exposure controls:

8.2.1 Occupational exposure controls:
- Measure the concentration in the air regularly
- Work under local exhaust/ventilation

8.2.2 Environmental exposure controls: see heading 13

8.3 Personal protection:

8.3.1 respiratory protection:
- Dust production: dust mask with filter type P3
- High dust production: compressed air/oxygen apparatus

8.3.2 hand protection:
- Gloves
  Suitable materials: No data available

- Breakthrough time: N.D.

8.3.3 eye protection:
- Safety glasses
- In case of dust production: protective goggles

8.3.4 skin protection:
- Protective clothing
- In case of dust production: head/neck protection
  Suitable materials: No data available

9. Physical and chemical properties

9.1 General information:

Appearance (at 20°C)	:	Crystalline solid / Scales
Odour	:	Odourless
Colour	:	Colourless to fluorescent yellow-green

9.2 Important health, safety and environmental information:

pH value	:	N.D.	
Boiling point/boiling range	:	N.A.	**°C**
Flashpoint	:	N.D.	**°C**
Explosion limits	:	N.D.	**vol%** (**°C**)
Vapour pressure (at 20°C)	:	0.00007	**hPa**
Vapour pressure (at 50°C)	:	N.D.	**hPa**
Relative density (at 20°C)	:	1.3	
Water solubility	:	0.00001	**g/100 ml**
Soluble in	:	Ether, acetone, oils/fats	
Relative vapour density	:	N.D.	
Viscosity	:	N.D.	**Pa.s**
Partition coëfficient n-octanol/water	:	5.61/5.79	
Evaporation rate			
ratio to butyl acetate	:	N.D.	
ratio to ether	:	N.D.	

9.3 Other information:

Melting point/melting range	:	160	**°C**
Auto-ignition point	:	N.D.	**°C**
Saturation concentration	:	N.D.	**g/m^3**

10. Stability and reactivity

10.1 Conditions to avoid/reactivity:
- Stable under normal conditions

10.2 Materials to avoid:
- Keep away from: heat sources, ignition sources, oxidizing agents, acids

10.3 Hazardous decomposition products:
- Upon combustion CO and CO2 are formed
- Reacts violently with (strong) oxidizers
- Decomposes on exposure to (strong) acids

11. Toxicological information

11.1 Acute toxicity:

LD50 oral rat	:	N.D.	**mg/kg**
LD50 dermal rat	:	N.D.	**mg/kg**
LD50 dermal rabbit	:	N.D.	**mg/kg**
LC50 inhalation rat	:	N.D.	**mg/l/4 h**
LC50 inhalation rat	:	N.D.	**ppm/4 h**

11.2 Chronic toxicity:

EC carc. cat.	:	2
EC muta. cat.	:	not listed
EC repr. cat.	:	not listed
Carcinogenicity (TLV)	:	A2
Carcinogenicity (MAC)	:	K
Carcinogenicity (VME)	:	not listed
Carcinogenicity (GWBB)	:	not listed
Carcinogenicity (MAK)	:	2
Mutagenicity (MAK)	:	not listed
Teratogenicity (MAK)	:	-
IARC classification	:	2A

11.3 Routes of exposure: ingestion, inhalation, eyes and skin
Caution! Substance is absorbed through the skin

11.4 Acute effects/symptoms:

AFTER SKIN CONTACT
- Slight irritation

11.5 Chronic effects:

- Probably human carcinogenic
- Mutagenicity: AMES test positive
- Probably human mutagenic

ON CONTINUOUS/REPEATED EXPOSURE/CONTACT:
- No specific information available

SIMILAR PRODUCTS CAUSE FOLLOWING SYMPTOMS:
- Feeling of weakness
- Photoallergy
- Skin rash/inflammation
- Cracking of the skin
- Skin cancer
- Lung tissue affection/degeneration
- Enlargement/affection of the liver
- Affection of the renal tissue

12. Ecological information

12.1 Ecotoxicity:

- LC50 (65 h) : 0.0018 mg/l (PIMEPHALES PROMELAS)
- EC50 (96 h) : 0.01 mg/l (DAPHNIA PULEX)

12.2 Mobility:

- **Volatile organic compounds (VOC):** 0%

- Photolysis in water
- Ozonation in water
- Insoluble in water

For other physicochemical properties see heading 9.

12.3 Persistence and degradability:

- **biodegradation BOD_5** : N.D. **% ThOD**
- **water** : - Not readily biodegradable in water
- **soil** : **T ½:** > 100 **days**

12.4 Bioaccumulative potential:
- **log P_{ow}** : 5.61/5.79
- **BCF** : 72 h : 350 (LEUCISCUS IDUS)
- Highly bioaccumulative

12.5 Other adverse effects:

- **WGK** : 3 (Classification based on the R-phrases in compliance with Verwaltungsvorschrift wassergefährdender Stoffe (VwVwS) of 17 May 1999)
- **Effect on the ozone layer** : Not dangerous for the ozone layer (Council Regulation (EC) 3093/94)
- **Greenhouse effect** : no data available
- **Effect on waste water purification** : no data available

13. Disposal considerations

13.1 Provisions relating to waste:

- Waste material code (91/689/EEC, Council Decision 2001/118/EC, O.J. L47 of 16/2/2001): 16 05 06 (laboratory chemicals, consisting of or containing dangerous substances, including mixtures of laboratory chemicals)
- Waste material code (Flanders): 001, 045, 691
- Waste code (Germany): 59302
- Hazardous waste (91/689/EEC)

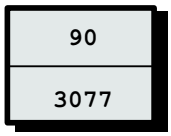
13.2 Disposal methods:

- Dissolve or mix with a combustible solvent
- Remove to an authorized incinerator equipped with an afterburner and a flue gas scrubber
- Do not discharge into surface water (2000/60/EEC, Council Decision 2455/2001/EC)

13.3 Packaging/Container:

- Waste material code packaging (91/689/EEC, Council Decision 2001/118/EC, O.J. L47 of 16/2/2001): 15 01 10 (packaging containing residues of or contaminated by dangerous substances)

14. Transport information



14.1 Classification of the substance in compliance with UN Recommendations

UN number	: 3077
CLASS	: 9
SUB RISKS	: -
PACKING	: III
PROPER SHIPPING NAME	: UN 3077, Environmentally hazardous substance, solid, n.o.s. (benzo[a]anthracene)

14.2 ADR (transport by road)

CLASS	: 9
PACKING	: III
DANGER LABEL TANKS	: 9
DANGER LABEL PACKAGES	: 9

14.3 RID (transport by rail)

CLASS	: 9
PACKING	: III
DANGER LABEL TANKS	: 9
DANGER LABEL PACKAGES	: 9

14.4 ADNR (transport by inland waterways)

CLASS	: 9
PACKING	: III
DANGER LABEL TANKS	: 9
DANGER LABEL PACKAGES	: 9

14.5 IMDG (maritime transport)

CLASS	: 9
SUB RISKS	: -
PACKING	: III
MFAG	: -
EMS	: -
MARINE POLLUTANT	: P

14.6 ICAO (air transport)

CLASS	: 9
SUB RISKS	: -
PACKING	: III
PACKING INSTRUCTIONS PASSENGER AIRCRAFT	:
PACKING INSTRUCTIONS CARGO AIRCRAFT	:

14.7 Special precautions in connection with transport : none

14.8 Limited quantities (LQ) :

When substances and their packaging meet the conditions established by ADR/RID/ADNR in chapter 3.4, **only** the following prescriptions shall be complied with:
each package shall display a diamond-shaped figure with the following inscription:
- 'UN 3077'
or, in the case of different goods with different identification numbers within a single package:
- the letters 'LQ'

15. Regulatory information

Enumerated in substance list Annex I of directive 67/548/EEC et sequens

Toxic

Dangerous for the environment

R45 : May cause cancer
R50/53 : Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

S53 : Avoid exposure - obtain special instructions before use
S45 : In case of accident or if you feel unwell, seek medical advice (show the label where possible)
S60 : This material and/or its container must be disposed of as hazardous waste
S61 : Avoid release to the environment. Refer to special instructions/safety data sheets.

16. Other information

The information provided on this MSDS is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

N.A. = NOT APPLICABLE
N.D. = NOT DETERMINED
***** = INTERNAL CLASSIFICATION

Full text of any R-phrases referred to under heading 2:

R45 : May cause cancer
R50/53 : Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

Exposure limits:
TLV : Threshold Limit Value - ACGIH USA 2000
OES : Occupational Exposure Standards - United Kingdom 1999
MEL : Maximum Exposure Limits - United Kingdom 1999
MAK : Maximale Arbeitsplatzkonzentrationen - Germany 2001
TRK : Technische Richtkonzentrationen - Germany 2001
MAC : Maximale aanvaarde concentratie - The Netherlands 2002
VME : Valeurs limites de Moyenne d'Exposition - France 1999
VLE : Valeurs limites d'Exposition à court terme - France 1999
GWBB : Grenswaarde beroepsmatige blootstelling - Belgium 1998
GWK : Grenswaarde kortstondige blootstelling - Belgium 1998
EC : Indicative occupational exposure limit values - directive 2000/39/EC

Chronic toxicity:
K : List of the carcinogenic substances and processes - The Netherlands 2002

SAFETY DATA SHEET

Version 6.15
Revision Date 09/05/2024
Print Date 09/06/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Benzo[a]pyrene

Product Number : B1760
Brand : Sigma
Index-No. : 601-032-00-3
CAS-No. : 50-32-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Skin sensitization (Category 1), H317
Germ cell mutagenicity (Category 1B), H340
Carcinogenicity (Category 1B), H350

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operates as MilliporeSigma in the US and Canada

Reproductive toxicity (Category 1B), H360
Short-term (acute) aquatic hazard (Category 1), H400
Long-term (chronic) aquatic hazard (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal Word Danger

Hazard Statements

H317	May cause an allergic skin reaction.
H340	May cause genetic defects.
H350	May cause cancer.
H360	May damage fertility or the unborn child.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary Statements

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P261	Avoid breathing dust.
P272	Contaminated work clothing must not be allowed out of the workplace.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P333 + P313	If skin irritation or rash occurs: Get medical advice/ attention.
P363	Wash contaminated clothing before reuse.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	3,4-Benzpyrene 3,4-Benzopyrene Benzo[def]chrysene
Formula	:	$C_{20}H_{12}$
Molecular weight	:	252.31 g/mol
CAS-No.	:	50-32-8
EC-No.	:	200-028-5
Index-No.	:	601-032-00-3

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Component	Classification	Concentration
benzo[a]pyrene		
	Skin Sens. 1; Muta. 1B; Carc. 1B; Repr. 1B; Aquatic Acute 1; Aquatic Chronic 1; H317, H340, H350, H360, H400, H410 Concentration limits: >= 0.01 %: Carc. 1B, H350;	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Call in physician.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

In case of eye contact
After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

If swallowed
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Water Foam Carbon dioxide (CO2) Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

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5.2 Special hazards arising from the substance or mixture

Carbon oxides
Combustible.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information

Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Avoid generation and inhalation of dusts in all circumstances. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully. Dispose of properly. Clean up affected area. Avoid generation of dusts.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Work under hood. Do not inhale substance/mixture.

Hygiene measures
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Dry. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.

Storage class
Storage class (TRGS 510): 6.1C: Combustible, acute toxic Cat.3 / toxic compounds or compounds which causing chronic effects

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7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
	Remarks	Suspected human carcinogen		
benzo[a]pyrene	50-32-8	TWA	0.2 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		OSHA specifically regulated carcinogen		
		TWA	0.1 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen		
		PEL	0.2 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		PEL	0.2 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
benzo[a]pyrene	50-32-8	1-Hydroxypyrene	2.5 µg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift at end of workweek			
		3-hydroxybenzo(a)pyrene		Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift at end of workweek			

8.2 Exposure controls

Appropriate engineering controls

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

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Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
Handle with impervious gloves.

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

Body Protection
protective clothing

Respiratory protection
Recommended Filter type: Filter type P3
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when dusts are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid Color: yellow
b)	Odor	weakly aromatic
c)	Odor Threshold	No data available
d)	pH	No data available

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e)	Melting point/freezing point	Melting point/ range: 177 - 180 °C (351 - 356 °F) - lit.
f)	Initial boiling point and boiling range	495 °C 923 °F - lit.
g)	Flash point	()Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Density	1.35 g/cm3 - (HSDB)
	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Autoignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	none

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
The following applies in general to flammable organic substances and mixtures: in correspondingly fine distribution, when whirled up a dust explosion potential may generally be assumed.

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
Violent reactions possible with:
Strong oxidizing agents

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10.4 Conditions to avoid
no information available

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
Oral: No data available
Inhalation: No data available
Dermal: No data available

Skin corrosion/irritation
Skin - Mouse
Result: Mild skin irritation
Remarks: (RTECS)

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitization
May cause allergic skin reaction. Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Germ cell mutagenicity
May cause genetic defects.
Test Type: Ames test
Test system: Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Result: positive
Remarks: (Lit.)
Test Type: Mutagenicity (mammal cell test): chromosome aberration.
Test system: Chinese hamster ovary cells
Metabolic activation: with and without metabolic activation
Result: positive
Remarks: (National Toxicology Program)
Test Type: sister chromatid exchange assay
Test system: Chinese hamster ovary cells
Metabolic activation: with and without metabolic activation
Result: positive
Remarks: (National Toxicology Program)

Test Type: Chromosome aberration test
Species: Mouse
Cell type: Bone marrow
Application Route: Intraperitoneal injection

Result: positive

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Remarks: (National Toxicology Program)

Carcinogenicity
Presumed to have carcinogenic potential for humans

IARC: 1 - Group 1: Carcinogenic to humans (benzo[a]pyrene)

NTP: RAHC - Reasonably anticipated to be a human carcinogen (benzo[a]pyrene)

OSHA: OSHA specifically regulated carcinogen (benzo[a]pyrene)

Reproductive toxicity
May damage the unborn child.
May damage fertility.

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

RTECS: DJ3675000
burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 0.25 mg/l - 48 h Remarks: (above the solubility limit in the test medium) (ECOTOX Database)
Toxicity to algae	static test ErC50 - Scenedesmus acutus - 0.005 mg/l - 72 h Remarks: (ECOTOX Database)

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential

Bioaccumulation	Lepomis macrochirus (Bluegill) - 48 h - 0.0005 mg/l(benzo[a]pyrene)
	Bioconcentration factor (BCF): 3,208

12.4 Mobility in soil
No data available

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12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties

No data available

12.7 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)

UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (benzo[a]pyrene)
Reportable Quantity (RQ): 1 lbs
Poison Inhalation Hazard: No

IMDG

UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (benzo[a]pyrene)
Marine pollutant : yes
Marine pollutant : no

IATA

UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (benzo[a]pyrene)

Further information

EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

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SECTION 15: Regulatory information

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
benzo[a]pyrene	50-32-8	1	1

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Acute Health Hazard
Chronic Health Hazard

SARA 313 : The following components are subject to reporting levels established by SARA Title III, Section 313:

benzo[a]pyrene 50-32-8 >= 90 - <= 100 %

US State Regulations

Massachusetts Right To Know

benzo[a]pyrene 50-32-8

Pennsylvania Right To Know

benzo[a]pyrene 50-32-8

Maine Chemicals of High Concern

Product does not contain any listed chemicals

Vermont Chemicals of High Concern

Product does not contain any listed chemicals

Washington Chemicals of High Concern

Product does not contain any listed chemicals

California Prop. 65

WARNING: This product can expose you to chemicals including benzo[a]pyrene, which is/are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

The ingredients of this product are reported in the following inventories:

TSCA : All substances listed as active on the TSCA inventory

TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

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SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.15 Revision Date: 09/05/2024 Print Date: 09/06/2024

The life science business of Merck KGaA, Darmstadt, Germany
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SAFETY DATA SHEET

Revision Date 10-Feb-2015 **Revision Number** 1

1. Identification

Product Name **Benzo[ghi]perylene**

Cat No. : **AC105550000; AC105550050; AC105550250; AC105551000**

Synonyms 1,12-Benzoperylene

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Entity / Business Name
Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
Classification under 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Label Elements
None required

Hazards not otherwise classified (HNOC)
Very toxic to aquatic life with long lasting effects

3. Composition / information on ingredients

Component	CAS-No	Weight %
Benzo(ghi)perylene	191-24-2	> 98

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.

Skin Contact Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Obtain medical attention.

Inhalation Remove from exposure, lie down. Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Obtain medical attention.

Ingestion Clean mouth with water. Get medical attention.

Most important symptoms/effects No information available.
Notes to Physician Treat symptomatically

5. Fire-fighting measures

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature No information available
Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products
Carbon monoxide (CO) Carbon dioxide (CO_2)
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
0	0	0	N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment.
Environmental Precautions See Section 12 for additional ecological information. Avoid release to the environment. Collect spillage.

Methods for Containment and Clean Up Avoid dust formation. Sweep up or vacuum up spillage and collect in suitable container for disposal. Do not let this chemical enter the environment.

7. Handling and storage

Handling Avoid contact with skin and eyes. Do not breathe dust. Do not breathe vapors or spray mist.

Storage Keep in a dry, cool and well-ventilated place. Keep container tightly closed.

8. Exposure controls / personal protection

Exposure Guidelines This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Engineering Measures Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

Eye/face Protection	Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin and body protection	Wear appropriate protective gloves and clothing to prevent skin exposure.
Respiratory Protection	Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.
Hygiene Measures	Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Solid
Appearance	Yellow
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	276 - 280 °C / 528.8 - 536 °F
Boiling Point/Range	No information available > @ 760 mmHg
Flash Point	No information available
Evaporation Rate	No information available
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	No information available
Relative Density	No information available
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	C22 H12
Molecular Weight	276.33

10. Stability and reactivity

Reactive Hazard	None known, based on information available
Stability	Stable.
Conditions to Avoid	Excess heat. Exposure to light. Incompatible products.
Incompatible Materials	Strong oxidizing agents
Hazardous Decomposition Products	Carbon monoxide (CO), Carbon dioxide (CO_2)
Hazardous Polymerization	Hazardous polymerization does not occur.
Hazardous Reactions	None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information	No acute toxicity information is available for this product
Component Information	
Toxicologically Synergistic	No information available

Products

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Benzo(ghi)perylene	191-24-2	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known
STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated. See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

Do not empty into drains.

Persistence and Degradability No information available
Bioaccumulation/ Accumulation No information available.

Mobility .

Component	log Pow
Benzo(ghi)perylene	7.23

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT Not regulated
TDG Not regulated
IATA Not regulated
IMDG/IMO Not regulated

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL

Benzo(ghi)perylene	-	-	-	205-883-8	-		-	-	-	-	-

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Benzo(ghi)perylene	191-24-2	> 98	1.0

SARA 311/312 Hazardous Categorization

Acute Health Hazard	No
Chronic Health Hazard	No
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Benzo(ghi)perylene	-	-	X	X

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Benzo(ghi)perylene	5000 lb	-

California Proposition 65 This product does not contain any Proposition 65 chemicals

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Benzo(ghi)perylene	X	X	X	X	-

U.S. Department of Transportation

Reportable Quantity (RQ):	N
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security

This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class Non-controlled

16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Revision Date 10-Feb-2015
Print Date 10-Feb-2015
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer
The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS

Fisher Scientific

Part of Thermo Fisher Scientific

SAFETY DATA SHEET

Creation Date 01-May-2012 **Revision Date** 23-Jan-2015 **Revision Number** 2

1. Identification

Product Name **Benzoic acid**

Cat No. : **A63-500; A65-500; A68-30**

Synonyms Benzenecarboxylic acid; Benzenemethanoic acid; Phenylcarboxylic acid; Phenylformic acid; Benzeneformic acid; Carboxybenzene

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number
CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Skin Corrosion/irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 1
Specific target organ toxicity - (repeated exposure)	Category 1
Target Organs - Lungs.	

Label Elements

Signal Word
Danger

Hazard Statements
Causes skin irritation
Causes serious eye damage
Causes damage to organs through prolonged or repeated exposure

Precautionary Statements
Prevention
Wash face, hands and any exposed skin thoroughly after handling
Wear protective gloves/protective clothing/eye protection/face protection
Do not breathe dust/fume/gas/mist/vapors/spray
Do not eat, drink or smoke when using this product
Response
Get medical attention/advice if you feel unwell
Skin
IF ON SKIN: Wash with plenty of soap and water
If skin irritation occurs: Get medical advice/attention
Take off contaminated clothing and wash before reuse
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
Immediately call a POISON CENTER or doctor/physician
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
May form combustible dust concentrations in air

3. Composition / information on ingredients

Component	CAS-No	Weight %
Benzoic acid	65-85-0	>95

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Immediate medical attention is required.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Obtain medical attention.

Inhalation Remove from exposure, lie down. Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Obtain medical attention.

Ingestion Do not induce vomiting. Obtain medical attention.

Most important symptoms/effects Causes eye burns. Repeated or prolonged skin contact may cause allergic reactions with susceptible persons.

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Water spray. Carbon dioxide (CO_2). Dry chemical. chemical foam.

Unsuitable Extinguishing Media No information available

Flash Point 121 °C / 249.8 °F
Method - No information available

Autoignition Temperature Not applicable 570 °C / 1058 °F
Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Dust can form an explosive mixture in air.

Hazardous Combustion Products
Carbon monoxide (CO) Carbon dioxide (CO_2)
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
3	1	0	N/A

6. Accidental release measures

Personal Precautions Use personal protective equipment. Ensure adequate ventilation.
Environmental Precautions See Section 12 for additional ecological information.

Methods for Containment and Clean Up Sweep up or vacuum up spillage and collect in suitable container for disposal. Avoid dust formation.

7. Handling and storage

Handling Avoid contact with skin and eyes. Avoid ingestion and inhalation. Do not breathe dust.

Storage Keep in a dry, cool and well-ventilated place. Keep container tightly closed. Keep away from heat and sources of ignition.

8. Exposure controls / personal protection

Exposure Guidelines This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Engineering Measures Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Solid
Appearance	Off-white
Odor	aromatic
Odor Threshold	No information available
pH	2.5-3.5 2.9 g/l water
Melting Point/Range	121 - 123 °C / 249.8 - 253.4 °F
Boiling Point/Range	249 °C / 480.2 °F @ 760 mmHg
Flash Point	121 °C / 249.8 °F

Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	1.3 hPa @ 96 °C
Vapor Density	Not applicable
Relative Density	No information available
Solubility	soluble
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	Not applicable 570 °C / 1058 °F
Decomposition Temperature	No information available
Viscosity	Not applicable
Molecular Formula	C7 H6 O2
Molecular Weight	122.12

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products. Avoid dust formation.

Incompatible Materials Strong acids, Strong bases, Strong oxidizing agents, Strong reducing agents, Metals

Hazardous Decomposition Products Carbon monoxide (CO), Carbon dioxide (CO_2)

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions Aqueous solution, May react with metals and lead to the formation of flammable hydrogen gas.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Benzoic acid	1700 mg/kg (Rat) 2565 mg/kg (Rat)	Not listed	26 mg/m³ (Rat) 1 h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Irritating to eyes, respiratory system and skin

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Benzoic acid	65-85-0	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects Not mutagenic in AMES Test

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known
STOT - repeated exposure Lungs

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available
Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated. See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Benzoic acid	5 mg/L EC50 = 3 h	180 mg/L LC50 96 h	EC50 = 16.85 mg/L 30 min EC50 = 16.9 mg/L 15 min	300 mg/L EC50 = 24 h 860 mg/L EC50 = 48 h

Persistence and Degradability Soluble in water Persistence is unlikely based on information available.
Bioaccumulation/ Accumulation No information available.

Mobility Is not likely mobile in the environment due its low water solubility. Will likely be mobile in the environment due to its water solubility.

Component	log Pow
Benzoic acid	1.93

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT Not regulated
TDG Not regulated
IATA Not regulated
IMDG/IMO Not regulated

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Benzoic acid	X	X	-	200-618-2	-		X	X	X	X	X

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313 Not applicable

SARA 311/312 Hazardous Categorization

Acute Health Hazard	Yes
Chronic Health Hazard	Yes
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Benzoic acid	X	5000 lb	-	-

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Benzoic acid	5000 lb	-

California Proposition 65 This product does not contain any Proposition 65 chemicals

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Benzoic acid	X	X	X	-	-

U.S. Department of Transportation

Reportable Quantity (RQ):	N
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

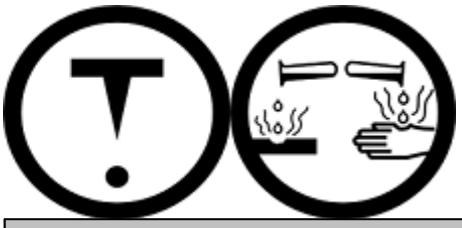
U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class E Corrosive material
D2A Very toxic materials



16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 01-May-2012
Revision Date 23-Jan-2015
Print Date 23-Jan-2015
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer

The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS

SAFETY DATA SHEET

Version 5.4
Revision Date 01/02/2015
Print Date 02/18/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Benzyl butyl phthalate

Product Number : 308501
Brand : Aldrich
Index-No. : 607-430-00-3

CAS-No. : 85-68-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Reproductive toxicity (Category 1B), H360
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H360 May damage fertility or the unborn child.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P273 Avoid release to the environment.
P281 Use personal protective equipment as required.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P391 Collect spillage.
P405 Store locked up.

P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula : $C_{19}H_{20}O_4$
Molecular weight : 312.36 g/mol
CAS-No. : 85-68-7
EC-No. : 201-622-7
Index-No. : 607-430-00-3

Hazardous components

Component	Classification	Concentration
Benzyl butyl phthalate Included in the Candidate List of Substances of Very High Concern (SVHC) according to Regulation (EC) No. 1907/2006 (REACH)		
	Repr. 1B; Aquatic Acute 1; Aquatic Chronic 1; H360, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 480 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

Splash contact
Material: Nature latex/chloroprene
Minimum layer thickness: 0.6 mm
Break through time: 60 min

Material tested:Lapren® (KCL 706 / Aldrich Z677558, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/freezing point: < -34.99 °C (< -30.98 °F)
f)	Initial boiling point and boiling range	370 °C (698 °F)
g)	Flash point	113.0 °C (235.4 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	19.2 hPa (14.4 mmHg) at 250.0 °C (482.0 °F) 0.3 hPa (0.2 mmHg) at 150.0 °C (302.0 °F)
l)	Vapour density	No data available
m)	Relative density	1.1 g/cm3 at 25 °C (77 °F)
n)	Water solubility	0.00269 g/l at 25 °C (77 °F) - OECD Test Guideline 105 - slightly soluble
o)	Partition coefficient: n-octanol/water	log Pow: 4.91 at 20 °C (68 °F)
p)	Auto-ignition temperature	232.0 °C (449.6 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available

t) Oxidizing properties No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents, Strong bases

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - male and female - 2,330 mg/kg
(OECD Test Guideline 401)

Inhalation: No data available

LD50 Dermal - Rabbit - > 10,000 mg/kg

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
- Guinea pig
Result: Does not cause skin sensitisation.

Germ cell mutagenicity
Ames test
S. typhimurium
Result: negative

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

IARC:	3 - Group 3: Not classifiable as to its carcinogenicity to humans (Benzyl butyl phthalate)
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a

carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
Presumed human reproductive toxicant

Overexposure may cause reproductive disorder(s) based on tests with laboratory animals.

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information

Repeated dose toxicity - Rat - male - Oral - No observed adverse effect level - 550 mg/kg
RTECS: TH9990000

May cause endocrine disruption.

pancreas -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Lepomis macrochirus (Bluegill) - 1.7 mg/l - 96.0 h
	NOEC - Oncorhynchus mykiss (rainbow trout) - 0.48 mg/l - 96.0 h
	flow-through test LC50 - Pimephales promelas (fathead minnow) - 2.1 mg/l - 96 h (OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	static test LC50 - Daphnia magna (Water flea) - 1.8 mg/l - 48 h
Toxicity to algae	Growth inhibition EC50 - Desmodesmus subspicatus (green algae) - 0.31 mg/l - 72 h (OECD Test Guideline 201)

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 14 d Result: 81 % - Readily biodegradable

12.3 Bioaccumulative potential

Bioaccumulation	Lepomis macrochirus (Bluegill) - 21 d - 0.00973 mg/l
	Bioconcentration factor (BCF): 663

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

Avoid release to the environment.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3082 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, liquid, n.o.s. (Benzyl butyl phthalate)
Reportable Quantity (RQ): 100 lbs
Marine pollutant:yes
Poison Inhalation Hazard: No

IMDG
UN number: 3082 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Benzyl butyl phthalate)
Marine pollutant:yes

IATA
UN number: 3082 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, liquid, n.o.s. (Benzyl butyl phthalate)

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Benzyl butyl phthalate	85-68-7	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Benzyl butyl phthalate	85-68-7	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Benzyl butyl phthalate	85-68-7	1993-04-24

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. Benzyl butyl phthalate	85-68-7	2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
H360	May damage fertility or the unborn child.

H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
Repr.	Reproductive toxicity

HMIS Rating

Health hazard:	0
Chronic Health Hazard:	*
Flammability:	1
Physical Hazard	0

NFPA Rating

Health hazard:	1
Fire Hazard:	1
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.4 Revision Date: 01/02/2015 Print Date: 02/18/2016

SAFETY DATA SHEET

Version 4.6
Revision Date 12/29/2015
Print Date 01/29/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Beryllium

Product Number : 378135
Brand : Aldrich

CAS-No. : 7440-41-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 3), H301
Acute toxicity, Inhalation (Category 2), H330
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Skin sensitisation (Category 1), H317
Carcinogenicity (Category 1B), H350
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Specific target organ toxicity - repeated exposure (Category 1), H372

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H301 Toxic if swallowed.
H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H319 Causes serious eye irritation.
H330 Fatal if inhaled.
H335 May cause respiratory irritation.
H350 May cause cancer.

H372	Causes damage to organs through prolonged or repeated exposure.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P272	Contaminated work clothing should not be allowed out of the workplace.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P284	Wear respiratory protection.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician. Rinse mouth.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or doctor/ physician.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P333 + P313	If skin irritation or rash occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	Be
Molecular weight	:	9.01 g/mol
CAS-No.	:	7440-41-7
EC-No.	:	231-150-7

Hazardous components

Component	Classification	Concentration
Berylium foil		
	Acute Tox. 3; Acute Tox. 2; Skin Irrit. 2; Eye Irrit. 2A; Skin Sens. 1; Carc. 1B; STOT SE 3; STOT RE 1; H301, H315, H317, H319, H330, H335, H350, H372	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Beryllium oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

Keep in a dry place.
Storage class (TRGS 510): Non-combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Berylium foil	7440-41-7	TWA	2.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		CEIL	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Peak	25.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		TWA	2.000000microgram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
	Remarks	Z27.29-1970		
		CEIL	5.000000microgram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970		
		Peak	25.000000microgram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970		
		TWA	0.000050 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Beryllium sensitization Chronic beryllium disease (berylliosis) Confirmed human carcinogen Danger of cutaneous absorption Sensitizer		
		C	0.000500 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen See Appendix A		
		See Table Z-2		
		TWA	2.000000microgram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970		
		TWA	2.000000microgram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970		
		CEIL	5.000000microgram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970		
		CEIL	5.000000microgram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970		
		Peak	25.000000microgram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970		
		Peak	25.000000microgram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970		
		TWA	0.000050 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Beryllium sensitization		

		Chronic beryllium disease (berylliosis) Adopted values or notations enclosed are those for which changes are proposed in the NIC See Notice of Intended Changes (NIC) Confirmed human carcinogen Danger of cutaneous absorption Sensitizer		
		C	0.000500 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen See Appendix A		
		See Table Z-2		
		TWA	2microgram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970		
		CEIL	5microgram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970		
		Peak	25microgram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970		
		C	0.0005 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen See Appendix A		

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder Colour: grey
b)	Odour	odourless
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 1,278 °C (2,332 °F) - lit.
f)	Initial boiling point and boiling range	2,970 °C (5,378 °F) - lit.
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	1.85 g/cm3 at 25 °C (77 °F)
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Alkali metals

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available

Inhalation: No data available

Dermal: No data available

LD50 Intravenous - Rat - 0.496 mg/kg
Remarks: Liver:Hepatitis (hepatocellular necrosis), zonal.

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
Hamster
Lungs
Result: negative

Carcinogenicity

Carcinogenicity - Rat - Intratracheal
Tumorigenic:Neoplastic by RTECS criteria. Lungs, Thorax, or Respiration:Tumors. Lungs, Thorax, or Respiration:Bronchiogenic carcinoma.

Carcinogenicity - Rabbit - Intravenous
Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Musculoskeletal:Tumors.

Possible human carcinogen

IARC:	1 - Group 1: Carcinogenic to humans (Berylium foil)
NTP:	Known to be human carcinogen (Berylium foil)
	Known to be human carcinogenThe reference note has been added by TD based on the background information of the NTP. (Berylium foil)
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: DS1750000

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1567 Class: 6.1 (4.1) Packing group: II
Proper shipping name: Beryllium, powder
Reportable Quantity (RQ): 10 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 1567 Class: 6.1 (4.1) Packing group: II EMS-No: F-G, S-G
Proper shipping name: BERYLLIUM POWDER

IATA
UN number: 1567 Class: 6.1 (4.1) Packing group: II
Proper shipping name: Beryllium powder

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Berylium foil	7440-41-7	1993-04-24

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Berylium foil	7440-41-7	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Berylium foil	7440-41-7	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Berylium foil	7440-41-7	1993-04-24

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No.	Revision Date
Berylium foil	7440-41-7	2008-10-10

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Carc.	Carcinogenicity
Eye Irrit.	Eye irritation
H301	Toxic if swallowed.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H330	Fatal if inhaled.
H335	May cause respiratory irritation.
H350	May cause cancer.
H372	Causes damage to organs through prolonged or repeated exposure.
Skin Irrit.	Skin irritation
Skin Sens.	Skin sensitisation

HMIS Rating

Health hazard:	4
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	4
Fire Hazard:	3
Reactivity Hazard:	3

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

SAFETY DATA SHEET

Version 5.11
Revision Date 06/18/2015
Print Date 02/11/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Bis(2-ethylhexyl) phthalate

Product Number : 80030
Brand : Sigma-Aldrich
Index-No. : 607-317-00-9

CAS-No. : 117-81-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Reproductive toxicity (Category 1B), H360

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H360 May damage fertility or the unborn child.

Precautionary statement(s)
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P281 Use personal protective equipment as required.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P405 Store locked up.
P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Endocrine disrupting chemical(s)

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : 'Dioctyl' phthalate
Phthalic acid bis(2-ethylhexyl ester)
DEHP

Formula : $C_{24}H_{38}O_4$
Molecular weight : 390.56 g/mol
CAS-No. : 117-81-7
EC-No. : 204-211-0
Index-No. : 607-317-00-9
Registration number : 01-2119484611-38-XXXX

Hazardous components

Component	Classification	Concentration
bis(2-Ethylhexyl) phthalate Included in the Candidate List of Substances of Very High Concern (SVHC) according to Regulation (EC) No. 1907/2006 (REACH)		
	Repr. 1B; H360	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
bis(2-Ethylhexyl) phthalate	117-81-7	TWA	5.000000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Lower Respiratory Tract irritation Confirmed animal carcinogen with unknown relevance to humans		
		TWA	5.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen See Appendix A		
		ST	10.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen See Appendix A		
		TWA	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.2 mm
Break through time: 480 min
Material tested:Dermatril® P (KCL 743 / Aldrich Z677388, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 230 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	-50.0 °C (-58.0 °F)
f)	Initial boiling point and boiling range	386 °C (727 °F) - lit.
g)	Flash point	207.0 °C (404.6 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Lower explosion limit: 0.3 %(V)
k)	Vapour pressure	1.6 hPa (1.2 mmHg) at 93.0 °C (199.4 °F)
l)	Vapour density	No data available
m)	Relative density	0.985 g/cm3 at 20 °C (68 °F)
n)	Water solubility	insoluble

o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	390.0 °C (734.0 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 30,000 mg/kg

Inhalation: No data available

LD50 Dermal - Rabbit - 25,000 mg/kg

No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Mild skin irritation - 24 h

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Mild eye irritation - 24 h

Respiratory or skin sensitisation
Maximisation Test (GPMT) - Guinea pig
Result: Does not cause skin sensitisation.
(OECD Test Guideline 406)

Germ cell mutagenicity
No data available

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

IARC: 2B - Group 2B: Possibly carcinogenic to humans (bis(2-Ethylhexyl) phthalate)

NTP: Reasonably anticipated to be a human carcinogen (bis(2-Ethylhexyl) phthalate)

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
May cause congenital malformation in the fetus.
Presumed human reproductive toxicant

May cause reproductive disorders.

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: TI0350000

Effects due to ingestion may include:, Gastrointestinal disturbance

Kidney -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - > 0.67 mg/l - 96 h
	LC50 - Oncorhynchus mykiss (rainbow trout) - > 0.32 mg/l - 96 h
	LC50 - Cyprinodon variegatus (sheepshead minnow) - > 0.17 mg/l - 96 h
	LC50 - Lepomis macrochirus (Bluegill) - > 0.20 mg/l - 96 h
	NOEC - other fish - > 0.3 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	Immobilization EC50 - Daphnia magna (Water flea) - > 0.16 mg/l - 48 h

12.2 Persistence and degradability

Biodegradability	Result: - Readily biodegradable (OECD Test Guideline 301)

12.3 Bioaccumulative potential

Bioaccumulation	Oncorhynchus mykiss (rainbow trout) - 100 d - 0.014 mg/l Bioconcentration factor (BCF): 113 Remarks: Does not bioaccumulate.

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3082 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, liquid, n.o.s. (bis(2-Ethylhexyl) phthalate)
Reportable Quantity (RQ): 100 lbs

Poison Inhalation Hazard: No

IMDG
Not dangerous goods

IATA
Not dangerous goods

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
bis(2-Ethylhexyl) phthalate	117-81-7	2007-07-01

SARA 311/312 Hazards
Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
bis(2-Ethylhexyl) phthalate	117-81-7	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
bis(2-Ethylhexyl) phthalate	117-81-7	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
bis(2-Ethylhexyl) phthalate	117-81-7	2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer. bis(2-Ethylhexyl) phthalate	CAS-No. 117-81-7	Revision Date 2009-02-01
WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. bis(2-Ethylhexyl) phthalate	CAS-No. 117-81-7	Revision Date 2009-02-01

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

H360	May damage fertility or the unborn child.
Repr.	Reproductive toxicity

HMIS Rating

Health hazard:	0
Chronic Health Hazard:	*
Flammability:	1
Physical Hazard	0

NFPA Rating

Health hazard:	0
Fire Hazard:	1
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.11 Revision Date: 06/18/2015 Print Date: 02/11/2016

SAFETY DATA SHEET

Version 4.6
Revision Date 12/10/2015
Print Date 02/23/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Bromodichloromethane

Product Number : 139181
Brand : Aldrich

CAS-No. : 75-27-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 4), H302
Skin irritation (Category 2), H315
Serious eye damage (Category 1), H318
Carcinogenicity (Category 2), H351
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H302 Harmful if swallowed.
H315 Causes skin irritation.
H318 Causes serious eye damage.
H335 May cause respiratory irritation.
H351 Suspected of causing cancer.

Precautionary statement(s)
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.

P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear eye protection/ face protection.
P280	Wear protective gloves.
P281	Use personal protective equipment as required.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell. Rinse mouth.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P312	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/ physician.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	Dichlorobromomethane
Formula	:	$CHBrCl_2$
Molecular weight	:	163.83 g/mol
CAS-No.	:	75-27-4
EC-No.	:	200-856-7

Hazardous components

Component	Classification	Concentration
Bromodichloromethane		
	Acute Tox. 4; Skin Irrit. 2; Eye Dam. 1; Carc. 2; STOT SE 3; H302, H315, H318, H335, H351	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Hydrogen chloride gas, Hydrogen bromide gas

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): Non Combustible Liquids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Splash contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 120 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid, clear Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -55 °C (-67 °F) - lit.
f)	Initial boiling point and boiling range	87 °C (189 °F) - lit.
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	1.98 g/cm3 at 25 °C (77 °F)

n)	Water solubility	insoluble
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents, Strong bases, Magnesium

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Mouse - 450.0 mg/kg
Remarks: Brain and Coverings:Changes in circulation (hemorrhage,thrombosis, etc.). Liver:Fatty liver degeneration. Blood: Hemorrhage.

TDLo Oral - Rat - 40 mg/kg
Remarks: Nutritional and Gross Metabolic:Weight loss or decreased weight gain.

TDLo Oral - Rat - 35 mg/kg
Remarks: Liver:Other changes. Kidney, Ureter, Bladder:Other changes.

TDLo Oral - Rat - 20.5 mg/kg
Remarks: Liver:Liver function tests impaired.

TDLo Oral - Rat - 400 mg/kg
Remarks: Biochemical:Enzyme inhibition, induction, or change in blood or tissue levels:Hepatic microsomal mixed oxidase (dealkylation, hydroxylation, etc.). Liver:Other changes.

TDLo Oral - Rat - 2,000 mg/kg
Remarks: Kidney, Ureter, Bladder:Changes in both tubules and glomeruli. Kidney, Ureter, Bladder:Other changes in urine composition.

TDLo Oral - Rat - 9,828 mg/kg
Remarks: Blood:Changes in erythrocyte (RBC) count. Nutritional and Gross Metabolic:Weight loss or decreased weight gain. Biochemical:Enzyme inhibition, induction, or change in blood or tissue levels: Transaminases.

TDLo Oral - Rat - 2,904.6 mg/kg
Remarks: Behavioral:Fluid intake. Nutritional and Gross Metabolic:Weight loss or decreased weight gain. Nutritional and Gross Metabolic:Dehydration.

TDLo Oral - Rat - 5,366.9 mg/kg
Remarks: Kidney, Ureter, Bladder:Changes in kidney weight. Endocrine:Other changes. Skin and Appendages: Other: Hair.

TDLo Oral - Rat - 3,127 mg/kg
Remarks: Behavioral:Fluid intake. Nutritional and Gross Metabolic:Weight loss or decreased weight gain.

TDLo Oral - Rat - 20,075 mg/kg
Remarks: Liver:Fatty liver degeneration. Liver:Other changes. Liver:Changes in liver weight.

TDLo Oral - Rat - 5,670 mg/kg
Remarks: Liver:Changes in liver weight. Blood:Changes in serum composition (e.g., TP, bilirubin, cholesterol). Nutritional and Gross Metabolic:Weight loss or decreased weight gain.

TDLo Oral - Rat - 742 mg/kg
Remarks: Nutritional and Gross Metabolic:Weight loss or decreased weight gain. Behavioral:Food intake (animal).

TDLo Oral - Rat - 2,000 mg/kg
Remarks: Kidney, Ureter, Bladder:Changes in both tubules and glomeruli. Kidney, Ureter, Bladder:Other changes in urine composition.

TDLo Oral - Rat - 375 mg/kg
Remarks: Endocrine:Estrogenic. Blood:Changes in serum composition (e.g., TP, bilirubin, cholesterol).

TDLo Oral - Rat - 750 mg/kg
Remarks: Biochemical:Enzyme inhibition, induction, or change in blood or tissue levels:Hepatic microsomal mixed oxidase (dealkylation, hydroxylation, etc.). Liver:Changes in liver weight. Kidney, Ureter, Bladder:Other changes.

TDLo Oral - Mouse - 1,000 mg/kg
Remarks: Kidney, Ureter, Bladder:Renal function tests depressed. Blood:Changes in serum composition (e.g., TP, bilirubin, cholesterol).

TDLo Oral - Mouse - 750 mg/kg
Remarks: Biochemical:Enzyme inhibition, induction, or change in blood or tissue levels: Dehydrogenases. Biochemical:Enzyme inhibition, induction, or change in blood or tissue levels: Transaminases. Liver:Changes in liver weight.

TDLo Oral - Rabbit - 59.5 mg/kg
Remarks: Behavioral:Fluid intake. Behavioral:Food intake (animal).

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
Irritating to eyes, respiratory system and skin.

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
Laboratory experiments have shown mutagenic effects.

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Limited evidence of carcinogenicity in animal studies

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Bromodichloromethane)

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: Reasonably anticipated to be a human carcinogen (Bromodichloromethane)

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
Inhalation - May cause respiratory irritation.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: PA5310000

prolonged or repeated exposure can cause:, Nausea, Dizziness, Headache, narcosis

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3082 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, liquid, n.o.s. (Bromodichloromethane)
Reportable Quantity (RQ): 5000 lbs

Poison Inhalation Hazard: No

IMDG
Not dangerous goods

IATA
Not dangerous goods

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Bromodichloromethane	75-27-4	2009-07-17

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Bromodichloromethane	75-27-4	2009-07-17

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Bromodichloromethane	75-27-4	2009-07-17

New Jersey Right To Know Components

	CAS-No.	Revision Date
Bromodichloromethane	75-27-4	2009-07-17

California Prop. 65 Components

WARNING! This product contains a chemical known to the	CAS-No.	Revision Date
State of California to cause cancer.	75-27-4	2007-09-28
Bromodichloromethane		

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Carc.	Carcinogenicity
Eye Dam.	Serious eye damage
H302	Harmful if swallowed.
H315	Causes skin irritation.
H318	Causes serious eye damage.
H335	May cause respiratory irritation.
H351	Suspected of causing cancer.
Skin Irrit.	Skin irritation
STOT SE	Specific target organ toxicity - single exposure

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.6 Revision Date: 12/10/2015 Print Date: 02/23/2016

SAFETY DATA SHEET

Revision Date 24-Dec-2021 **Revision Number** 4

1. Identification

Product Name **Cadmium**

Cat No. : **C3-500**

CAS No 7440-43-9
Synonyms No information available

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company
Fisher Scientific Company
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable solids	Category 2
Acute oral toxicity	Category 4
Acute dermal toxicity	Category 4
Acute Inhalation Toxicity - Dusts and Mists	Category 2
Germ Cell Mutagenicity	Category 2
Carcinogenicity	Category 1A
Reproductive Toxicity	Category 2
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system.	
Specific target organ toxicity - (repeated exposure)	Category 1
Target Organs - Kidney, Blood.	
Combustible dust	Yes

Label Elements

Signal Word

Danger

Hazard Statements
Flammable solid
May form combustible dust concentrations in air
Fatal if inhaled
Harmful if swallowed
Harmful in contact with skin
May cause respiratory irritation
Suspected of causing genetic defects
May cause cancer
Suspected of damaging fertility. Suspected of damaging the unborn child
Causes damage to organs through prolonged or repeated exposure

Precautionary Statements
Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Do not breathe dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting equipment
Response
IF exposed or concerned: Get medical attention/advice
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Immediately call a POISON CENTER or doctor/physician
Skin
IF ON SKIN: Wash with plenty of soap and water
Wash contaminated clothing before reuse
Call a POISON CENTER or doctor/physician if you feel unwell
Ingestion
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
Rinse mouth
Fire
Fight fire with normal precautions from a reasonable distance
Evacuate area
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Very toxic to aquatic life with long lasting effects
WARNING. Cancer and Reproductive Harm - https://www.p65warnings.ca.gov/.

3. Composition/Information on Ingredients

Component	CAS No	Weight %
Cadmium	7440-43-9	100

4. First-aid measures

General Advice Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.

Inhalation Remove to fresh air. If not breathing, give artificial respiration. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Immediate medical attention is required.

Ingestion Do NOT induce vomiting. Call a physician or poison control center immediately.

Most important symptoms and effects None reasonably foreseeable. . Kidney disorders: May cause harm to the unborn child: Blood disorders

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature No information available

Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Thermal decomposition can lead to release of irritating gases and vapors. Fine dust dispersed in air may ignite. Dust can form an explosive mixture with air. Pyrophoric properties of solids and liquids. Do not allow run-off from fire-fighting to enter drains or water courses.

Hazardous Combustion Products
Toxic fumes.
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health	Flammability	Instability	Physical hazards
4	1	0	N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment as required. Avoid dust

formation. Keep people away from and upwind of spill/leak. Evacuate personnel to safe areas.

Environmental Precautions Do not flush into surface water or sanitary sewer system. Do not allow material to contaminate ground water system. Prevent product from entering drains. Local authorities should be advised if significant spillages cannot be contained.

Methods for Containment and Clean Up Sweep up and shovel into suitable containers for disposal. Avoid dust formation.

7. Handling and storage

Handling Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Avoid dust formation. Use only under a chemical fume hood. Do not breathe (dust, vapor, mist, gas). Do not ingest. If swallowed then seek immediate medical assistance.

Storage. Keep containers tightly closed in a dry, cool and well-ventilated place. Store under an inert atmosphere. Incompatible Materials. Strong oxidizing agents. Strong acids. Sulfur oxides.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Cadmium	TWA: 0.01 mg/m³ TWA: 0.002 mg/m³	Ceiling: 0.3 mg/m³ Ceiling: 0.6 mg/m³ (Vacated) STEL: 0.3 ppm TWA: 0.1 mg/m³ TWA: 0.2 mg/m³ TWA: 5 µg/m³	IDLH: 9 mg/m³	TWA: 0.01 mg/m³ TWA: 0.002 mg/m³

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: NIOSH - National Institute for Occupational Safety and Health

Engineering Measures Use only under a chemical fume hood. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures When using do not eat, drink or smoke. Provide regular cleaning of equipment, work area and clothing. Avoid contact with skin, eyes or clothing. Wash hands before breaks and immediately after handling the product. Keep away from food, drink and animal feeding stuffs.

9. Physical and chemical properties

Physical State Solid

Appearance	Silver
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	321 °C / 609.8 °F
Boiling Point/Range	765 °C / 1409 °F @ 760 mmHg
Flash Point	No information available
Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	Not applicable
Specific Gravity	8.64 @ 25°C
Solubility	Insoluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	Not applicable
Molecular Formula	Cd
Molecular Weight	112.40

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under recommended storage conditions. Moisture sensitive. Air sensitive.

Conditions to Avoid Incompatible products. Excess heat. Avoid dust formation. Exposure to air or moisture over prolonged periods.

Incompatible Materials Strong oxidizing agents, Strong acids, Sulfur oxides

Hazardous Decomposition Products Toxic fumes

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Cadmium	LD50 = 2330 mg/kg (Rat)	Not listed	LC50 = 25 mg/m³ (Rat) 30 min

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
Cadmium	7440-43-9	Group 1	Known	A2	X	A2

IARC (International Agency for Research on Cancer)	*IARC (International Agency for Research on Cancer)* *Group 1 - Carcinogenic to Humans* *Group 2A - Probably Carcinogenic to Humans* *Group 2B - Possibly Carcinogenic to Humans*
NTP: (National Toxicity Program)	*NTP: (National Toxicity Program)* *Known - Known Carcinogen* *Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen*
ACGIH: (American Conference of Governmental Industrial Hygienists)	*A1 - Known Human Carcinogen* *A2 - Suspected Human Carcinogen* *A3 - Animal Carcinogen* *ACGIH: (American Conference of Governmental Industrial Hygienists)*

Mutagenic Effects Possible risk of irreversible effects

Reproductive Effects Possible risk of impaired fertility. May cause harm to the unborn child.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system
STOT - repeated exposure Kidney Blood

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Kidney disorders: May cause harm to the unborn child: Blood disorders

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

The product contains following substances which are hazardous for the environment. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Cadmium	Not listed	LC50: 0.0004 - 0.003 mg/L, 96h (Pimephales promelas) LC50: = 0.016 mg/L, 96h (Oryzias latipes) LC50: = 21.1 mg/L, 96h flow-through (Lepomis macrochirus) LC50: = 0.24 mg/L, 96h static (Cyprinus carpio) LC50: = 4.26 mg/L, 96h semi-static (Cyprinus carpio) LC50: = 0.002 mg/L, 96h	Not listed	EC50: = 0.0244 mg/L, 48h Static (Daphnia magna)

		(Cyprinus carpio) LC50: = 0.006 mg/L, 96h static (Oncorhynchus mykiss) LC50: = 0.003 mg/L, 96h flow-through (Oncorhynchus mykiss)		

Persistence and Degradability No information available

Bioaccumulation/ Accumulation No information available.

Mobility No information available.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No	UN2930
Proper Shipping Name	Toxic solid, flammable, organic, n.o.s.
Technical Name	Cadmium
Hazard Class	6.1
Subsidiary Hazard Class	4.1
Packing Group	I

TDG

UN-No	UN2930
Proper Shipping Name	Toxic solid, flammable, organic, n.o.s.
Hazard Class	6.1
Subsidiary Hazard Class	4.1
Packing Group	I

IATA

UN-No	UN2930
Proper Shipping Name	Toxic solid, flammable, organic, n.o.s.
Hazard Class	6.1
Subsidiary Hazard Class	4.1
Packing Group	I

IMDG/IMO

UN-No	UN2930
Proper Shipping Name	Toxic solid, flammable, organic, n.o.s.
Hazard Class	6.1
Subsidiary Hazard Class	4.1
Packing Group	I

15. Regulatory information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	TSCA - EPA Regulatory Flags
Cadmium	7440-43-9	X	ACTIVE	-

Legend:
TSCA US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories

Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), China (IECSC), Korea (KECL).

Component	CAS No	DSL	NDSL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
Cadmium	7440-43-9	X	-	231-152-8	X	X		X	X	KE-04397

KECL - NIER number or KE number (http://ncis.nier.go.kr/en/main.do)

U.S. Federal Regulations

SARA 313

Component	CAS No	Weight %	SARA 313 - Threshold Values %
Cadmium	7440-43-9	100	0.1

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Cadmium	-	-	X	X

Clean Air Act

OSHA - Occupational Safety and Health Administration Not applicable

Component	Specifically Regulated Chemicals	Highly Hazardous Chemicals
Cadmium	5 µg/m³ TWA 2.5 µg/m³ Action Level	-

CERCLA This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Cadmium	10 lb	-

California Proposition 65 This product contains the following Proposition 65 chemicals.

Component	CAS No	California Prop. 65	Prop 65 NSRL	Category
Cadmium	7440-43-9	Carcinogen Developmental Male Reproductive	0.05 µg/day	Developmental Carcinogen

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Cadmium	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ): Y
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Authorisation/Restrictions according to EU REACH

Component	REACH (1907/2006) - Annex XIV - Substances Subject to Authorization	REACH (1907/2006) - Annex XVII - Restrictions on Certain Dangerous Substances	REACH Regulation (EC 1907/2006) article 59 - Candidate List of Substances of Very High Concern (SVHC)
Cadmium	-	Use restricted. See item 72. (see link for restriction details) Use restricted. See item 23. (see link for restriction details) Use restricted. See item 28. (see link for restriction details) Use restricted. See item 75. (see link for restriction details)	SVHC Candidate list - 231-152-8 - Carcinogenic, Article 57a;Specific target organ toxicity after repeated exposure, Article 57(f) - human health

After the sunset date the use of this substance requires either an authorization or can only be used for exempted uses, e.g. use in scientific research and development which includes routine analytics or use as intermediate.

https://echa.europa.eu/authorisation-list
https://echa.europa.eu/substances-restricted-under-reach
https://echa.europa.eu/candidate-list-table

Safety, health and environmental regulations/legislation specific for the substance or mixture

Component	CAS No	OECD HPV	Persistent Organic Pollutant	Ozone Depletion Potential	Restriction of Hazardous Substances (RoHS)
Cadmium	7440-43-9	Listed	Not applicable	Not applicable	0.01% (Max. Conc.)

Component	CAS No	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)
Cadmium	7440-43-9	Not applicable	Not applicable	Not applicable	Annex I - Y26

16. Other information

Prepared By Regulatory Affairs
Thermo Fisher Scientific
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Revision Date 24-Dec-2021
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Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

SAFETY DATA SHEET

Version 6.6
Revision Date 09/08/2024
Print Date 09/09/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Calcium

Product Number : 215147
Brand : Aldrich
Index-No. : 020-001-00-X
CAS-No. : 7440-70-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Chemicals which, in contact with water, emit flammable gases (Category 2), H261

For the full text of the H-Statements mentioned in this Section, see Section 16.

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2.2 GHS Label elements, including precautionary statements

Pictogram

Signal Word Danger

Hazard Statements

H261 In contact with water releases flammable gas.

Precautionary Statements

P223 Do not allow contact with water.

P231 + P232 Handle under inert gas. Protect from moisture.

P280 Wear protective gloves/ eye protection/ face protection.

P335 + P334 Brush off loose particles from skin. Immerse in cool water/ wrap in wet bandages.

P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.

P402 + P404 Store in a dry place. Store in a closed container.

P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	Ca
Molecular weight	:	40.08 g/mol
CAS-No.	:	7440-70-2
EC-No.	:	231-179-5
Index-No.	:	020-001-00-X

No components need to be disclosed according to the applicable regulations.

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

In case of eye contact
After eye contact: rinse out with plenty of water. Remove contact lenses.

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If swallowed
After swallowing: make victim drink water (two glasses at most). Consult doctor if feeling unwell.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Special powder against metal fire Cover with dry sand or cement.

Unsuitable extinguishing media
Water Carbon dioxide (CO2) Foam

5.2 Special hazards arising from the substance or mixture
Calcium oxide
Not combustible.
May not get in touch with: Water
Ambient fire may liberate hazardous vapours.

5.3 Advice for firefighters
In the event of fire, wear self-contained breathing apparatus.

5.4 Further information
Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Avoid inhalation of dusts. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains. Risk of explosion.

6.3 Methods and materials for containment and cleaning up
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up dry. Dispose of properly. Clean up affected area. Avoid generation of dusts.

6.4 Reference to other sections
For disposal see section 13.

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SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Keep workplace dry. Do not allow product to come into contact with water.

Hygiene measures
Change contaminated clothing. Wash hands after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Keep away from heat and sources of ignition.
Never allow product to get in contact with water during storage.

Handle and store under inert gas. Air sensitive.

Storage class
Storage class (TRGS 510): 4.3: Hazardous materials, which set free flammable gases upon contact with water

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Change contaminated clothing. Wash hands after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

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This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

Body Protection
protective clothing

Respiratory protection
Recommended Filter type: Filter type P1
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when dusts are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains. Risk of explosion.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: granular Color: silver
b)	Odor	No data available
c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/ range: 850 °C (1562 °F) - lit.
f)	Initial boiling point and boiling range	1,484 °C 2,703 °F - lit.
g)	Flash point	()Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available

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k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Density	1.54 g/mL at 25 °C (77 °F) - lit.
	Relative density	1.5420 °C
n)	Water solubility	(reaction)
o)	Partition coefficient: n-octanol/water	Not applicable for inorganic substances
p)	Autoignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	none

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
Risk of explosion with:
alkali hydroxides
metallic oxides
Strong oxidizing agents
Oxides of phosphorus
nitrogen dioxide
alkali salts
sulfur
Exothermic reaction with:
Ammonia
Hydrogen halides
Mercury
Risk of ignition or formation of inflammable gases or vapours with:
halogens
Oxygen
Acids
Water
Hydrogen

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10.4 Conditions to avoid
Air
Moisture.

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
Oral: No data available
Inhalation: No data available
Dermal: No data available
No data available

Skin corrosion/irritation
Remarks: No data available

Serious eye damage/eye irritation
Remarks: No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

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11.2 Additional Information

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., Cough, Shortness of breath, Headache, Nausea
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties
No data available

12.7 Other adverse effects
No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)
UN number: 1401 Class: 4.3 Packing group: II
Proper shipping name: Calcium
Reportable Quantity (RQ):
Poison Inhalation Hazard: No

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IMDG
UN number: 1401 Class: 4.3 Packing group: II EMS-No: F-G, S-O
Proper shipping name: CALCIUM

IATA
UN number: 1401 Class: 4.3 Packing group: II
Proper shipping name: Calcium

SECTION 15: Regulatory information

CERCLA Reportable Quantity

This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Reactivity Hazard

SARA 313 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

US State Regulations

Massachusetts Right To Know

calcium	7440-70-2

Pennsylvania Right To Know

calcium	7440-70-2

Maine Chemicals of High Concern

Product does not contain any listed chemicals

Vermont Chemicals of High Concern

Product does not contain any listed chemicals

Washington Chemicals of High Concern

Product does not contain any listed chemicals

The ingredients of this product are reported in the following inventories:

TSCA : All substances listed as active on the TSCA inventory

TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

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SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 6.6 Revision Date: 09/08/2024 Print Date: 09/09/2024

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SAFETY DATA SHEET

Version 3.8
Revision Date 10/12/2015
Print Date 01/29/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Carbazole

Product Number : C5132
Brand : Sigma

CAS-No. : 86-74-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Carcinogenicity (Category 2), H351
Chronic aquatic toxicity (Category 4), H413

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)
H351 Suspected of causing cancer.
H413 May cause long lasting harmful effects to aquatic life.

Precautionary statement(s)
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P273 Avoid release to the environment.
P281 Use personal protective equipment as required.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P405 Store locked up.
P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	$C_{12}H_9N$
Molecular weight	:	167.21 g/mol
CAS-No.	:	86-74-8
EC-No.	:	201-696-0

Hazardous components

Component	Classification	Concentration
Carbazole		
	Carc. 2; Aquatic Chronic 4; H351, H413	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Nitrogen oxides (NOx)

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

Keep in a dry place.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder Colour: beige
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 243 - 246 °C (469 - 475 °F)
f)	Initial boiling point and boiling range	355 °C (671 °F)
g)	Flash point	220.0 °C (428.0 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	The product is not flammable.
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	533 hPa (400 mmHg) at 323 °C (613 °F)
l)	Vapour density	No data available
m)	Relative density	1.1 g/cm3 at 18 °C (64 °F)
n)	Water solubility	0.00091 g/l at 25 °C (77 °F)
o)	Partition coefficient: n-octanol/water	log Pow: 3.72 at 22 °C (72 °F)
p)	Auto-ignition temperature	> 600 °C (> 1,112 °F) at 1,013 hPa (760 mmHg)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD0 Oral - Rat - > 16,000 mg/kg
(OECD Test Guideline 401)

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

Carcinogenicity - Mouse - male and female - Oral
hepatocellular carcinoma

Limited evidence of carcinogenicity in animal studies

IARC:	2B - Group 2B: Possibly carcinogenic to humans (Carbazole)
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: FE3150000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - > 0.93 mg/l - 96.0 h Remarks: No toxicity at the limit of solubility
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 2.30 - 4.90 mg/l - 48 h Remarks: No toxicity at the limit of solubility
Toxicity to algae	Growth inhibition NOEC - Scenedesmus acuminatus - > 0.4 mg/l - 96 h Remarks: No toxicity at the limit of solubility

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential

Bioaccumulation	Cyprinus carpio (Carp) - 42 d - 0.05 mg/l Bioconcentration factor (BCF): 241 Cyprinus carpio (Carp) - 42 d - 0.005 mg/l Bioconcentration factor (BCF): 200

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
Not dangerous goods

IMDG
UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Carbazole)
Marine pollutant:yes
IATA
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Carbazole)

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Chronic Health Hazard

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Carbazole	86-74-8	2009-07-17

New Jersey Right To Know Components

	CAS-No.	Revision Date
Carbazole	86-74-8	2009-07-17

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No.	Revision Date
Carbazole	86-74-8	2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
H351	Suspected of causing cancer.
H413	May cause long lasting harmful effects to aquatic life.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	0
Reactivity Hazard:	0
Health hazard:	2
Fire Hazard:	1
Reactivity Hazard:	0

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 3.8 Revision Date: 10/12/2015 Print Date: 01/29/2016

SAFETY DATA SHEET

Version 5.6
Revision Date 12/10/2015
Print Date 02/09/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Carbon disulfide

Product Number : 180173
Brand : Sigma-Aldrich
Index-No. : 006-003-00-3

CAS-No. : 75-15-0

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 2), H225
Acute toxicity, Inhalation (Category 4), H332
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Reproductive toxicity (Category 2), H361
Specific target organ toxicity - repeated exposure, Inhalation (Category 1), H372
Acute aquatic toxicity (Category 2), H401

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H225	Highly flammable liquid and vapour.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H361	Suspected of damaging fertility or the unborn child.
H372	Causes damage to organs through prolonged or repeated exposure if inhaled.

H401	Toxic to aquatic life.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P210	Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	CS_2
Molecular weight	:	76.14 g/mol
CAS-No.	:	75-15-0
EC-No.	:	200-843-6
Index-No.	:	006-003-00-3

Hazardous components

Component	Classification	Concentration
Carbon disulphide		
	Flam. Liq. 2; Acute Tox. 4; Skin Irrit. 2; Eye Irrit. 2A; Repr. 2; STOT RE 1; Aquatic Acute 2; H225, H315, H319, H332, H361, H372, H401	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Sulphur oxides
Flash back possible over considerable distance., Container explosion may occur under fire conditions., Vapours may form explosive mixture with air., May explode when heated.

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

Use explosion-proof equipment.Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Refrigerate before opening.
Storage class (TRGS 510): Flammable liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Carbon disulphide	75-15-0	TWA	1 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Peripheral Nervous System impairment Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen Danger of cutaneous absorption		
		TWA	1.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Peripheral Nervous System impairment Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen Danger of cutaneous absorption		
		TWA	20.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.3-1968		
		CEIL	30.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.3-1968		
		Peak	100.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.3-1968		
		TWA	1.000000 ppm 3.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential for dermal absorption		
		ST	10.000000 ppm 30.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential for dermal absorption		
		See Table Z-2		
		TWA	20 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.3-1968		
		CEIL	30 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.3-1968		

		Peak	100 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.3-1968		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Carbon disulphide	75-15-0	2-Thiothiazolidine-4-carboxylix acid (TTCA)	0.5000 mg/g	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift (As soon as possible after exposure ceases)			

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Colour: colourless
b)	Odour	Stench.
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -112 °C (-170 °F) - lit.
f)	Initial boiling point and boiling range	46 °C (115 °F) - lit.
g)	Flash point	-30 °C (-22 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 50 %(V) Lower explosion limit: 1.3 %(V)
k)	Vapour pressure	394.956 hPa (296.241 mmHg) at 20 °C (68 °F) 1,342.711 hPa (1,007.116 mmHg) at 55 °C (131 °F)
l)	Vapour density	2.63 - (Air = 1.0)
m)	Relative density	1.266 g/mL at 25 °C (77 °F)
n)	Water solubility	2.9 g/l at 20 °C (68 °F) - OECD Test Guideline 105
o)	Partition coefficient: n-octanol/water	log Pow: 2.7 at 25 °C (77 °F)
p)	Auto-ignition temperature	97 - 107 °C (207 - 225 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Surface tension	71.9 mN/m at 19.5 °C (67.1 °F)
Relative vapour density	2.63 - (Air = 1.0)

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Vapours may form explosive mixture with air.

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Alkali metals, Zinc, Amines, Azides, Oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - female - > 2,000 mg/kg
(OECD Test Guideline 423)

LC50 Inhalation - Rat - male and female - 4 h - 10.35 mg/l
(OECD Test Guideline 403)

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
- Mouse
Result: Does not cause skin sensitisation.
(OECD Test Guideline 429)

Germ cell mutagenicity
Laboratory experiments have shown mutagenic effects.

Ames test
Salmonella typhimurium
Result: negative

Carcinogenicity

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
Suspected human reproductive toxicant

May cause reproductive disorders.

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: FF6650000

May cause convulsions.

Liver - Irregularities - Based on Human Evidence
Liver - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Poecilia reticulata (guppy) - 4 mg/l - 96 h (OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	Immobilization EC50 - Daphnia magna (Water flea) - 2.1 mg/l - 48 h (OECD Test Guideline 202)
Toxicity to algae	Growth inhibition EC50 - Chlorella pyrenoidosa - 21 mg/l - 96 h (OECD Test Guideline 201)

12.2 Persistence and degradability

Biodegradability: aerobic - Exposure time 28 d
Result: > 80 % - Readily biodegradable
(OECD Test Guideline 301D)

12.3 Bioaccumulative potential

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Toxic to aquatic life.

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1131 Class: 3 (6.1) Packing group: I
Proper shipping name: Carbon disulfide
Reportable Quantity (RQ): 100 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 1131 Class: 3 (6.1) Packing group: I EMS-No: F-E, S-D
Proper shipping name: CARBON DISULPHIDE

IATA
UN number: 1131 Class: 3 (6.1)
Proper shipping name: Carbon disulphide
IATA Passenger: Not permitted for transport
IATA Cargo: Not permitted for transport

15. REGULATORY INFORMATION

SARA 302 Components

The following components are subject to reporting levels established by SARA Title III, Section 302:

	CAS-No.	Revision Date
Carbon disulphide	75-15-0	2007-07-01

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Carbon disulphide	75-15-0	2007-07-01

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Carbon disulphide	75-15-0	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Carbon disulphide	75-15-0	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Carbon disulphide	75-15-0	2007-07-01

California Prop. 65 Components

WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

	CAS-No.	Revision Date
Carbon disulphide	75-15-0	2008-06-17

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Eye Irrit.	Eye irritation
Flam. Liq.	Flammable liquids
H225	Highly flammable liquid and vapour.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H361	Suspected of damaging fertility or the unborn child.
H372	Causes damage to organs through prolonged or repeated exposure if inhaled.
H401	Toxic to aquatic life.
Repr.	Reproductive toxicity

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	3
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	3
Reactivity Hazard:	0

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.6 Revision Date: 12/10/2015 Print Date: 02/09/2016

SAFETY DATA SHEET

Version 5.10
Revision Date 01/06/2016
Print Date 03/03/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Carbon tetrachloride

Product Number : 319961
Brand : Sigma-Aldrich
Index-No. : 602-008-00-5

CAS-No. : 56-23-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 3), H301
Acute toxicity, Inhalation (Category 3), H331
Acute toxicity, Dermal (Category 3), H311
Skin sensitisation (Sub-category 1B), H317
Carcinogenicity (Category 2), H351
Specific target organ toxicity - repeated exposure, Inhalation (Category 1), Liver, Kidney, H372
Acute aquatic toxicity (Category 3), H402
Chronic aquatic toxicity (Category 3), H412
Hazardous to the ozone layer (Category 1), H420

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H301 + H311 + H331	Toxic if swallowed, in contact with skin or if inhaled
H317	May cause an allergic skin reaction.
H351	Suspected of causing cancer.
H372	Causes damage to organs (Liver, Kidney) through prolonged or repeated exposure if inhaled.

H412	Harmful to aquatic life with long lasting effects.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P272	Contaminated work clothing should not be allowed out of the workplace.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician. Rinse mouth.
P302 + P352 + P312	IF ON SKIN: Wash with plenty of soap and water. Call a POISON CENTER or doctor/ physician if you feel unwell.
P304 + P340 + P311	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P333 + P313	If skin irritation or rash occurs: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.
P502	Refer to manufacturer/ supplier for information on recovery/ recycling.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Rapidly absorbed through skin.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	Tetrachloromethane
Formula	:	CCl_4CCl_4
Molecular weight	:	153.82 g/mol
CAS-No.	:	56-23-5
EC-No.	:	200-262-8
Index-No.	:	602-008-00-5

Hazardous components

Component	Classification	Concentration
Tetrachloromethane		
	Acute Tox. 3; Skin Sens. 1B; Carc. 2; STOT RE 1; Aquatic Acute 3; Aquatic Chronic 3; Ozone 1; H301 + H311 + H331, H317, H351, H372, H412	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Move out of dangerous area.Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): Non-combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Tetrachloromethane	56-23-5	TWA	5.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Liver damage Suspected human carcinogen Danger of cutaneous absorption		
		STEL	10.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Liver damage Suspected human carcinogen Danger of cutaneous absorption		
		ST	2.000000 ppm 12.600000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen See Appendix A		
		TWA	10.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.17-1967		
		CEIL	25.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.17-1967		
		Peak	200.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.17-1967		
		See Table Z-2		
		TWA	5 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Liver damage Suspected human carcinogen Danger of cutaneous absorption		
		STEL	10 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Liver damage Suspected human carcinogen Danger of cutaneous absorption		
		ST	2 ppm 12.6 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen See Appendix A		
		See Table Z-2		
		TWA	10 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.17-1967		
		CEIL	25 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.17-1967		
		Peak	200 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.17-1967		
		TWA	2 ppm 12.6 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 240 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Colour: colourless
b)	Odour	sweet
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -23 °C (-9 °F) - lit.
f)	Initial boiling point and boiling range	76 - 77 °C (169 - 171 °F) - lit.
g)	Flash point	does not flash
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower	No data available

	flammability or explosive limits	
k)	Vapour pressure	45 hPa (34 mmHg) at 0.3 °C (32.5 °F) 120 hPa (90 mmHg) at 19.8 °C (67.6 °F) 14,549 hPa (10,913 mmHg) at 24 °C (75 °F)
l)	Vapour density	No data available
m)	Relative density	1.594 g/cm3 at 25 °C (77 °F)
n)	Water solubility	0.8461 g/l at 20 °C (68 °F)
o)	Partition coefficient: n-octanol/water	log Pow: 2.83 at 25 °C (77 °F)
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Surface tension	26.7 mN/m at 20 °C (68 °F) 19.5 mN/m at 80 °C (176 °F)

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 2,350 mg/kg

LC50 Inhalation - Rat - 4 h - 8000 ppm

LD50 Dermal - Rabbit - > 20,000 mg/kg

No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Mild skin irritation - 24 h
(Draize Test)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Mild eye irritation - 24 h
(Draize Test)

Respiratory or skin sensitisation
- Mouse
Result: The product is a skin sensitiser, sub-category 1B.
(OECD Test Guideline 429)

Germ cell mutagenicity
No data available

Carcinogenicity

This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification. Limited evidence of carcinogenicity in animal studies

IARC:	2B - Group 2B: Possibly carcinogenic to humans (Tetrachloromethane)
NTP:	Reasonably anticipated to be a human carcinogen (Tetrachloromethane)
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
Inhalation - Causes damage to organs through prolonged or repeated exposure. - Liver, Kidney

Aspiration hazard
No data available

Additional Information
RTECS: FG4900000

Vomiting, Diarrhoea, Abdominal pain, Nausea, Dizziness, Headache, Damage to the eyes., Liver injury may occur., Kidney injury may occur., Exposure to and/or consumption of alcohol may increase toxic effects., Contact with skin can cause:, Pain, Erythema, hyperemia

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	mortality LC50 - Danio rerio (zebra fish) - 24.3 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	Immobilization EC50 - Daphnia magna (Water flea) - 35 mg/l - 48 h (OECD Test Guideline 202)
Toxicity to algae	Growth inhibition EC50 - Algae - 20 mg/l - 72 h (OECD Test Guideline 201)

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential

Bioaccumulation	Lepomis macrochirus (Bluegill) - 21 d - 52.3 µg/l
	Bioconcentration factor (BCF): 30

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Harmful to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1846 Class: 6.1 Packing group: II
Proper shipping name: Carbon tetrachloride
Reportable Quantity (RQ): 10 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 1846 Class: 6.1 Packing group: II EMS-No: F-A, S-A
Proper shipping name: CARBON TETRACHLORIDE
Marine pollutant: yes

IATA
UN number: 1846 Class: 6.1 Packing group: II
Proper shipping name: Carbon tetrachloride

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Tetrachloromethane	56-23-5	2007-07-01

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Tetrachloromethane	56-23-5	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Tetrachloromethane	56-23-5	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Tetrachloromethane	56-23-5	2007-07-01

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer.	56-23-5	2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
H301	Toxic if swallowed.
H301 + H311 + H331	Toxic if swallowed, in contact with skin or if inhaled
H311	Toxic in contact with skin.
H317	May cause an allergic skin reaction.
H331	Toxic if inhaled.
H351	Suspected of causing cancer.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.10 Revision Date: 01/06/2016 Print Date: 03/03/2016

SAFETY DATA SHEET

Version 6.4
Revision Date 03/08/2024
Print Date 05/12/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Chlorobenzene-$^{13}C_6$

Product Number : 488534
Brand : Aldrich
Index-No. : 602-033-00-1
CAS-No. : 287389-52-0

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquids (Category 3), H226
Acute toxicity, Inhalation (Category 4), H332
Short-term (acute) aquatic hazard (Category 2), H401
Long-term (chronic) aquatic hazard (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

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Pictogram

Signal Word Warning

Hazard Statements

H226	Flammable liquid and vapor.
H332	Harmful if inhaled.
H411	Toxic to aquatic life with long lasting effects.

Precautionary Statements

P210	Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P261	Avoid breathing mist or vapors.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ eye protection/ face protection.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor if you feel unwell.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P391	Collect spillage.
P403 + P235	Store in a well-ventilated place. Keep cool.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	$^{13}C_6H_5Cl$
Molecular weight	:	118.45 g/mol
CAS-No.	:	287389-52-0
Index-No.	:	602-033-00-1

Component	Classification	Concentration
Chlorobenzene-13C6		
	Flam. Liq. 3; Acute Tox. 4; Aquatic Acute 2; Aquatic Chronic 2; H226, H332, H401, H411	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

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SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. If breathing stops: mouth-to-mouth breathing or artificial respiration. Oxygen if necessary. Immediately call in physician.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

In case of eye contact
After eye contact: rinse out with plenty of water. Remove contact lenses.

If swallowed
After swallowing: make victim drink water (two glasses at most). Consult doctor if feeling unwell.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Water Foam Carbon dioxide (CO2) Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Carbon oxides
Hydrogen chloride gas
Combustible.
Vapors are heavier than air and may spread along floors.
Forms explosive mixtures with air at elevated temperatures.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

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5.4 Further information

Remove container from danger zone and cool with water. Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition.
Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains. Risk of explosion.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

Advice on protection against fire and explosion
Keep away from open flames, hot surfaces and sources of ignition.Take precautionary measures against static discharge.

Hygiene measures
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Keep container tightly closed in a dry and well-ventilated place. Keep away from heat and sources of ignition.

Storage class
Storage class (TRGS 510): 3: Flammable liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

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SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Chlorobenzene-13C6	287389-52-0	TWA	10 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Confirmed animal carcinogen with unknown relevance to humans		
		TWA	75 ppm 350 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		PEL	10 ppm 46 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Chlorobenzene-13C6	287389-52-0	4-Chlorocatechol	100mg/g creatinine	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift at end of workweek			
		p-Chlorophenol	20mg/g creatinine	Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift at end of workweek			

8.2 Exposure controls

Appropriate engineering controls
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
required

Body Protection
Flame retardant antistatic protective clothing.

Respiratory protection
Recommended Filter type: Filter type ABEK

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The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when vapours/aerosols are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains. Risk of explosion.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid
b)	Odor	No data available
c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -45 °C (-49 °F) - lit.
f)	Initial boiling point and boiling range	132 °C 270 °F - lit.
g)	Flash point	23.9 °C (75.0 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Density	1.164 g/mL at 25 °C (77 °F)1.164 g/cm3 at 25 °C (77 °F)
	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	log Pow: 5.0
p)	Autoignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available

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s) Explosive properties No data available

t) Oxidizing properties No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
Vapor/air-mixtures are explosive at intense warming.

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Heating.

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
Oral: No data available
LC50 Inhalation - 4.0 h - 11.0 mg/l - vapor

Inhalation: No data available
Dermal: No data available

Skin corrosion/irritation
Remarks: No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

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NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

Incoordination., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties
No data available

12.7 Other adverse effects
No data available

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SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself. See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14: Transport information

DOT (US)
UN number: 1134 Class: 3 Packing group: III
Proper shipping name: Chlorobenzene
Reportable Quantity (RQ): 100 lbs
Reportable Quantity (RQ): 100 lbs
Poison Inhalation Hazard: No

IMDG
UN number: 1134 Class: 3 Packing group: III EMS-No: F-E, S-D
Proper shipping name: CHLOROBENZENE
Marine pollutant : yes

IATA
UN number: 1134 Class: 3 Packing group: III
Proper shipping name: Chlorobenzene

SECTION 15: Regulatory information

SARA 302 Components
This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Chlorobenzene-13C6	287389-52-0	2007-07-01

SARA 311/312 Hazards
Fire Hazard, Chronic Health Hazard

Reportable Quantity : D021 lbs

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Chlorobenzene-13C6	287389-52-0	2007-07-01

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SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.4 Revision Date: 03/08/2024 Print Date: 05/12/2024

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SAFETY DATA SHEET

Version 6.11
Revision Date 09/06/2024
Print Date 09/07/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Chloroform

Product Number : 288306
Brand : Sigma-Aldrich
Index-No. : 602-006-00-4
CAS-No. : 67-66-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 4), H302
Acute toxicity, Inhalation (Category 3), H331
Skin irritation (Category 2), H315

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Eye irritation (Category 2A), H319
Carcinogenicity (Category 2), H351
Reproductive toxicity (Category 2), H361
Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336
Specific target organ toxicity - repeated exposure, Oral (Category 1), Liver, Kidney, H372
Short-term (acute) aquatic hazard (Category 3), H402

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal Word	Danger

Hazard Statements

H302	Harmful if swallowed.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H331	Toxic if inhaled.
H336	May cause drowsiness or dizziness.
H351	Suspected of causing cancer.
H361	Suspected of damaging fertility or the unborn child.
H372	Causes damage to organs (Liver, Kidney) through prolonged or repeated exposure if swallowed.
H402	Harmful to aquatic life.

Precautionary Statements

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe mist or vapors.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell. Rinse mouth.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P311	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal

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plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms : Trichloromethane
Methylidyne trichloride

Formula : $CHCl_3$
Molecular weight : 119.38 g/mol
CAS-No. : 67-66-3
EC-No. : 200-663-8
Index-No. : 602-006-00-4

Component	Classification	Concentration
Chloroform		
	Acute Tox. 4; Acute Tox. 3; Skin Irrit. 2; Eye Irrit. 2A; Carc. 2; Repr. 2; STOT SE 3; STOT RE 1; Aquatic Acute 3; H302, H331, H315, H319, H351, H361, H336, H372, H402 Concentration limits: 20 %: STOT SE 3, H336;	<= 100 %

ethanol		
	Flam. Liq. 2; Eye Irrit. 2A; H225, H319 Concentration limits: >= 50 %: Eye Irrit. 2A, H319;	>= 1 - < 5 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
First aiders need to protect themselves. Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Immediately call in physician. If breathing stops: immediately apply artificial respiration, if necessary also oxygen.

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In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

In case of eye contact
After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

If swallowed
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Water Foam Carbon dioxide (CO2) Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Carbon oxides
Hydrogen chloride gas
Combustible.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information
Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

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6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling

Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

Hygiene measures

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions

Tightly closed. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.

Storage class

Storage class (TRGS 510): 6.1D: Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Chloroform	67-66-3	TWA	10 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Confirmed animal carcinogen with unknown relevance to humans		
		ST	2 ppm 9.78 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen		

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		C	50 ppm 240 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		PEL	2 ppm 9.78 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
ethanol	64-17-5	TWA	1,000 ppm 1,900 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		STEL	1,000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Confirmed animal carcinogen with unknown relevance to humans		
		TWA	1,000 ppm 1,900 mg/m3	USA. NIOSH Recommended Exposure Limits
		PEL	1,000 ppm 1,900 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

8.2 Exposure controls

Appropriate engineering controls
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Full contact
Material: Viton®
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Splash contact
Material: butyl-rubber
Minimum layer thickness: 0.7 mm
Break through time: 10 min

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Material tested:Butoject® (KCL 898)

Body Protection
protective clothing

Respiratory protection
Recommended Filter type: Filter type AX
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when vapours/aerosols are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid, clear Color: colorless
b)	Odor	sweet
c)	Odor Threshold	205 ppm
d)	pH	No data available
e)	Melting point/freezing point	Melting point: -64 °C (-83 °F)
f)	Initial boiling point and boiling range	60.5 - 61.5 °C 140.9 - 142.7 °F at 1,013.25 hPa
g)	Flash point	() - Regulation (EC) No. 440/2008, Annex, A.9does not flash
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	210 hPa at 20 °C (68 °F)
l)	Vapor density	4.12 - (Air = 1.0)
m)	Density	1.49 g/cm3 at 25 °C (77 °F)
	Relative density	No data available
n)	Water solubility	8.7 g/l at 23 °C (73 °F) - OECD Test Guideline 105 - soluble
o)	Partition coefficient: n-octanol/water	No data available

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p)	Autoignition temperature	No data available
q)	Decomposition temperature	Distillable in an undecomposed state at normal pressure.
r)	Viscosity	No data available
s)	Explosive properties	Not classified as explosive.
t)	Oxidizing properties	none

9.2 Other safety information

Solubility in other solvents	organic solvent at 20 °C (68 °F) - miscible
Relative vapor density	4.12 - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity

No data available

10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .
Contains the following stabilizer(s):
ethanol (>=0.5 - <=1 %)

10.3 Possibility of hazardous reactions

Risk of explosion with:
Ammonia
Amines
nitrogen oxides
bases
Oxygen
alkali amides
organic nitro compounds
strong alkalis
Fluorine
peroxi compounds
Alkaline earth metals
Alkali metals
Powdered metals
Methanol
with
alcoholates
Methanol
with
strong alkalis
Iron
in powder form
various alloys

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sensitive to shock
Methanol
with
Sodium hydroxide
magnesium
in powder form
Oxygen
with
alkali compounds
Aluminum
in powder form
Acetone
with
alkali compounds
Potassium
sensitive to shock
sodium
sensitive to shock
Violent reactions possible with:
phosphines
bis(dimethylamino)dimethyl tin
nonmetallic hydrogen compounds
Powdered metals
Light metals
Ketones
mineral acids
Strong oxidizing agents
semimetallic hydrogen compounds

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
Acute toxicity estimate Oral - 912.56 mg/kg
(Calculation method)
LD50 Oral - Rat - male - 908 mg/kg
(OECD Test Guideline 401)
Acute toxicity estimate Inhalation - 4 h - 3.12 mg/l - vapor(Calculation method)

LC50 Inhalation - Rat - 6 h - 9.17 mg/l - vapor

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Acute toxicity estimate Inhalation - Expert judgment - 4 h - 3.1 mg/l - vapor

Dermal: No data available
No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Irritating to skin. - 24 h
Remarks: (ECHA)
Remarks: Drying-out effect resulting in rough and chapped skin.
Skin - Rabbit
Result: slight irritation
Remarks: (IUCLID)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Irritating to eyes.
Remarks: (ECHA)
Remarks: (Regulation (EC) No 1272/2008, Annex VI)

Respiratory or skin sensitization
Maximization Test - Guinea pig
Result: negative
(Regulation (EC) No. 440/2008, Annex, B.6)

Germ cell mutagenicity
Test Type: Ames test
Test system: Escherichia coli/Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Result: negative
Remarks: (ECHA)
Test Type: unscheduled DNA synthesis assay
Test system: Liver
Metabolic activation: without metabolic activation
Result: negative
Remarks: (ECHA)

Test Type: Micronucleus test
Species: Rat
Cell type: Red blood cells (erythrocytes)
Application Route: Oral
Method: OECD Test Guideline 474
Result: negative

Test Type: unscheduled DNA synthesis assay
Species: Rat
Cell type: Liver cells
Application Route: Oral
Method: OECD Test Guideline 486
Result: negative

Test Type: in vivo assay
Species: Mouse

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Application Route: Inhalation

Result: negative
Remarks: (ECHA)

Carcinogenicity
Suspected of causing cancer.

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Chloroform)

NTP: RAHC - Reasonably anticipated to be a human carcinogen (Chloroform)

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
Suspected of damaging the unborn child.

Specific target organ toxicity - single exposure
May cause drowsiness or dizziness.

Specific target organ toxicity - repeated exposure
Oral - Causes damage to organs through prolonged or repeated exposure.
- Liver, Kidney

Aspiration hazard
No data available

11.2 Additional Information

Repeated dose toxicity - Rat - female - Oral - NOAEL (No observed adverse effect level) - 34 mg/kg

Vomiting, Cough, irritant effects, Shortness of breath, respiratory arrest, narcosis, Dizziness, Nausea, agitation, spasms, inebriation, Headache, Stomach/intestinal disorders, ataxia (impaired locomotor coordination), cardiovascular disorders
Drying-out effect resulting in rough and chapped skin.
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to daphnia and other aquatic invertebrates	static test EC50 - Crassostrea gigas - 152.5 mg/l - 48 h Remarks: (ECHA)
Toxicity to algae	static test ErC50 - Chlamydomonas reinhardtii (green algae) - 13.3 mg/l - 72 h Remarks: (ECHA)

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Toxicity to daphnia and other aquatic invertebrates(Chronic toxicity)	semi-static test NOEC - Daphnia magna (Water flea) - 6.3 mg/l - 21 d Remarks: (ECHA)

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties
No data available

12.7 Other adverse effects
No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)
UN number: 1888 Class: 6.1 Packing group: III
Proper shipping name: ChloroformSOLUTION

Reportable Quantity (RQ): 10 lbs
Reportable Quantity (RQ): 10 lbs
Poison Inhalation Hazard: No

IMDG
UN number: 1888 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: CHLOROFORMSOLUTION

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IATA
UN number: 1888 Class: 6.1 Packing group: III
Proper shipping name: ChloroformSOLUTION

SECTION 15: Regulatory information

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
Chloroform	67-66-3	10	10
Chloroform	67-66-3	10	10 (D022)

SARA 304 Extremely Hazardous Substances Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
Chloroform	67-66-3	10	10

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

Components	CAS-No.	Component TPQ (lbs)
Chloroform	67-66-3	10000

SARA 313 : The following components are subject to reporting levels established by SARA Title III, Section 313:

Chloroform 67-66-3 >= 90 - <= 100 %

US State Regulations

Massachusetts Right To Know

Chloroform 67-66-3
ethanol 64-17-5

Pennsylvania Right To Know

Chloroform 67-66-3
ethanol 64-17-5

Maine Chemicals of High Concern

Product does not contain any listed chemicals

Vermont Chemicals of High Concern

Product does not contain any listed chemicals

Washington Chemicals of High Concern

Product does not contain any listed chemicals

California Prop. 65

WARNING: This product can expose you to chemicals including Chloroform, which is/are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

The ingredients of this product are reported in the following inventories:

TSCA : All substances listed as active on the TSCA inventory

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TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.11 Revision Date: 09/06/2024 Print Date: 09/07/2024

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SAFETY DATA SHEET

Version 6.8
Revision Date 09/07/2024
Print Date 09/08/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Chromium

Product Number : 266299
Brand : Aldrich
CAS-No. : 7440-47-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture.

2.2 GHS Label elements, including precautionary statements

Not a hazardous substance or mixture.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

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SECTION 3: Composition/information on ingredients

3.1 Substances

Formula : Cr
Molecular weight : 52.00 g/mol
CAS-No. : 7440-47-3
EC-No. : 231-157-5

Component	Classification	Concentration
chromium		
		<= 100 %

SECTION 4: First aid measures

4.1 Description of first-aid measures

If inhaled
After inhalation: fresh air.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

In case of eye contact
After eye contact: rinse out with plenty of water. Remove contact lenses.

If swallowed
After swallowing: make victim drink water (two glasses at most). Consult doctor if feeling unwell.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

Chromium oxides

5.3 Advice for firefighters

In the event of fire, wear self-contained breathing apparatus.

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5.4 Further information
none

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Avoid inhalation of dusts. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions
No special precautionary measures necessary.

6.3 Methods and materials for containment and cleaning up
Observe possible material restrictions (see sections 7 and 10). Take up dry. Dispose of properly. Clean up affected area. Avoid generation of dusts.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Dry.

Air sensitive.

Storage class
Storage class (TRGS 510): 11: Combustible Solids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

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Component	CAS-No.	Value	Control parameters	Basis
chromium	7440-47-3	TWA	0.5 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		PEL	0.5 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		TWA	1 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
chromium	7440-47-3	Total chromium	0.7 µg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift at end of workweek			

8.2 Exposure controls

Appropriate engineering controls
Change contaminated clothing. Wash hands after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the EC approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our

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customers. It should not be construed as offering an approval for any specific use scenario.

Respiratory protection
Recommended Filter type: Filter type P1
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when dusts are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
No special precautionary measures necessary.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder Color: light gray
b)	Odor	odorless
c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/ range: 1,857 °C (3,375 °F) - lit.
f)	Initial boiling point and boiling range	2,672 °C 4,842 °F - lit.
g)	Flash point	()Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Density	7.14 g/mL at 25 °C (77 °F) - lit.
	Relative density	No data available
n)	Water solubility	insoluble
o)	Partition coefficient: n-octanol/water	Not applicable for inorganic substances

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p)	Autoignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	none

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
Strong acids, Strong oxidizing agents

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
Oral: No data available
Inhalation: No data available
Dermal: No data available
No data available

Skin corrosion/irritation
Remarks: No data available

Serious eye damage/eye irritation
Remarks: No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity

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No data available

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

RTECS: GB4200000
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Cyprinus carpio (Carp) - 14.3 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 0.07 mg/l - 48 h

12.2 Persistence and degradability

The methods for determining biodegradability are not applicable to inorganic substances.

12.3 Bioaccumulative potential

Bioaccumulation	Oncorhynchus mykiss (rainbow trout) - 30 d - 50 µg/l(chromium)
	Bioconcentration factor (BCF): 1.03 - 1.22

12.4 Mobility in soil

No data available

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12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties

No data available

12.7 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)

UN number: 3077 Class: 9 Packing group: III

Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (chromium)

Reportable Quantity (RQ): 5000 lbs

Reportable Quantity (RQ): 10 lbs

Poison Inhalation Hazard: No

IMDG

Not dangerous goods

IATA

Not dangerous goods

Further information

Not classified as dangerous in the meaning of transport regulations.

SECTION 15: Regulatory information

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
chromium	7440-47-3	5000	5000

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SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Chronic Health Hazard

SARA 313 : The following components are subject to reporting levels established by SARA Title III, Section 313:

chromium	7440-47-3	>= 90 - <= 100 %

US State Regulations

Massachusetts Right To Know

chromium	7440-47-3

Pennsylvania Right To Know

chromium	7440-47-3

Maine Chemicals of High Concern

Product does not contain any listed chemicals

Vermont Chemicals of High Concern

Product does not contain any listed chemicals

Washington Chemicals of High Concern

Product does not contain any listed chemicals

The ingredients of this product are reported in the following inventories:

TSCA : All substances listed as active on the TSCA inventory

TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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SAFETY DATA SHEET

Based on Directive 2001/58/EC of the Commission of the European Communities

CHRYSENE

1. Identification of the substance/preparation and of the company/undertaking

1.1 Identification of the substance or preparation:

Synonyms: none
CAS No. : 218-01-9
EC index No. : 601-048-00-0
EINECS No. : 205-923-4
RTECS No. : GC0700000
BCR number : BCR-269
NFPA code : N.D.
Molecular weight : 228.30
Formula : C18H12

1.2 Use of the substance or the preparation:
Certified reference material for laboratory use only

1.3 Company/undertaking identification:
Institute for Reference Materials and Measurements
Retieseweg
B-2440 Geel
Tel. : +32 14 57 12 11
Fax : +32 14 58 42 73

1.4 Telephone number for emergency:
+32 70 245 245
Antigifcentrum
p/a Militair Hospitaal Koningin Astrid, Bruynstraat, B-1120 Brussel

2. Composition/information on ingredients

Hazardous ingredients	CAS No. EINECS No.	Conc. in %	Hazard symbol	Risks (R-phrases)
chrysene	218-01-9 205-923-4	100	T;N	45-50/53 (1)

(1) For R-phrases in full: see heading 16

3. Hazards identification

- May cause cancer
- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

4. First aid measures

4.1 Eye contact:
- Consult a doctor/medical service if irritation persists
- Rinse immediately with water

4.2 Skin contact:
- Consult a doctor/medical service if irritation persists
- Wash with water and soap
- Wipe off dry product from skin
- Remove clothing before washing

4.3 After inhalation:
- Consult a doctor/medical service if breathing problems develop
- Remove the victim into fresh air
- Unconscious: maintain adequate airway and respiration

4.4 After ingestion:
- Consult a doctor/medical service if you feel unwell
- Immediately give lots of water to drink
- Never give water to an unconscious person

- Do not induce vomiting

5. Fire-fighting measures

5.1 Suitable extinguishing media:
- Water spray
- Alcohol foam
- Polymer foam
- ABC powder
- Carbon dioxide

5.2 Unsuitable extinguishing media:
- Solid water jet ineffective as extinguishing medium

5.3 Special exposure hazards:
- Not easily combustible
- Upon combustion CO and CO2 are formed

5.4 Instructions:
- Take account of toxic firefighting water
- Use firefighting water moderately and contain it

5.5 Special protective equipment for firefighters:
- Heat/fire exposure: compressed air/oxygen apparatus
- Dust cloud production: compressed air/oxygen apparatus

6. Accidental release measures

6.1 Personal protection/precautions: see heading 8.1/8.3/10.3

6.2 Environmental precautions:
- Prevent soil and water pollution
- Substance must not be discharged into the sewer
- Dam up the solid spill

6.3 Methods for cleaning up:
- Stop dust cloud by covering with sand/earth
- Carefully collect the spill/leftovers
- Scoop solid spill into closing containers
- Spill must not return in its original container
- Take collected spill to manufacturer/competent authority
- Clean contaminated surfaces with an excess of water
- Wash clothing and equipment after handling

7. Handling and storage

7.1 Handling:
- Observe strict hygiene
- Avoid prolonged and repeated contact with skin
- Avoid raising dust
- Do not discharge the waste into the drain
- Remove contaminated clothing immediately

7.2 Storage:
- Keep container tightly closed. Store only in a limited quantity. Store in a dry area. Store in a dark area.
- Keep away from: heat sources, ignition sources, oxidizing agents, acids

Storage temperature	: N.D.	**°C**
Quantity limits	: N.D.	**kg**
Storage life	: N.D.	
Materials for packaging	:	

- suitable : no data available
- to avoid : no data available

7.3 Specific uses:
- See information supplied by the manufacturer

8. Exposure controls/Personal protection

8.1 Exposure limit values:

TLV-TWA	:	not listed
TLV-STEL	:	not listed
TLV-Ceiling	:	not listed
OES-LTEL	:	not listed
OES-STEL	:	not listed
MEL-LTEL	:	not listed
MEL-STEL	:	not listed
MAK	:	not listed
TRK	:	not listed
MAC-TGG 8 h	:	not listed
MAC-TGG 15 min.	:	not listed
MAC-Ceiling	:	not listed
VME-8 h	:	not listed
VLE-15 min.	:	not listed
GWBB-8 h	:	not listed
GWK-15 min.	:	not listed
Momentary value	:	not listed
EC	:	not listed
EC-STEL	:	not listed

Sampling methods:

- Chrysene (Polynuclear aromatic Hydrocarbons)	NIOSH 5515
- Chrysene	OSHA 58
- Chrysene (Polynuclear aromatic Hydrocarbons)	NIOSH 5506

8.2 Exposure controls:

8.2.1 Occupational exposure controls:
- Measure the concentration in the air regularly
- Work under local exhaust/ventilation

8.2.2 Environmental exposure controls: see heading 13

8.3 Personal protection:

8.3.1 respiratory protection:
- Dust production: dust mask with filter type P3
- High dust production: compressed air/oxygen apparatus

8.3.2 hand protection:
- Gloves
  Suitable materials: No data available

- Breakthrough time: N.D.

8.3.3 eye protection:
- Safety glasses
- In case of dust production: protective goggles

8.3.4 skin protection:
- Protective clothing
- In case of dust production: head/neck protection
  Suitable materials: No data available

9. Physical and chemical properties

9.1 General information:

Appearance (at 20°C)	:	Crystalline solid / Flakes
Odour	:	Odourless
Colour	:	White

9.2 Important health, safety and environmental information:

pH value	:	N.D.	
Boiling point/boiling range	:	448	**°C**
Flashpoint	:	N.D.	**°C**
Explosion limits	:	N.D.	**vol%** (**°C**)
Vapour pressure (at 20°C)	:	N.D.	**hPa**
Vapour pressure (at 50°C)	:	N.D.	**hPa**
Relative density (at 20°C)	:	1.27	
Water solubility	:	< 0.001	**g/100 ml**
Soluble in	:	N.D.	
Relative vapour density	:	N.D.	
Viscosity	:	N.D.	**Pa.s**
Partition coëfficient n-octanol/water	:	5.61/5.73	
Evaporation rate			
ratio to butyl acetate	:	N.D.	
ratio to ether	:	N.D.	

9.3 Other information:

Melting point/melting range	:	256	**°C**
Auto-ignition point	:	N.D.	**°C**
Saturation concentration	:	N.D.	**g/m^3**

10. Stability and reactivity

10.1 Conditions to avoid/reactivity:
- Stable under normal conditions

10.2 Materials to avoid:
- Keep away from: heat sources, ignition sources, oxidizing agents, acids

10.3 Hazardous decomposition products:
- Upon combustion CO and CO2 are formed
- Reacts violently with (strong) oxidizers
- Decomposes on exposure to (strong) acids

11. Toxicological information

11.1 Acute toxicity:

LD50 oral rat	:	N.D.	**mg/kg**
LD50 dermal rat	:	N.D.	**mg/kg**
LD50 dermal rabbit	:	N.D.	**mg/kg**
LC50 inhalation rat	:	N.D.	**mg/1/4 h**
LC50 inhalation rat	:	N.D.	**ppm/4 h**

11.2 Chronic toxicity:

EC carc. cat.	:	2
EC muta. cat.	:	3
EC repr. cat.	:	not listed
Carcinogenicity (TLV)	:	A3
Carcinogenicity (MAC)	:	K
Carcinogenicity (VME)	:	not listed
Carcinogenicity (GWBB)	:	not listed
Carcinogenicity (MAK)	:	2
Mutagenicity (MAK)	:	not listed
Teratogenicity (MAK)	:	-
IARC classification	:	3

11.3 Routes of exposure: ingestion, inhalation, eyes and skin
Caution! Substance is absorbed through the skin

11.4 Acute effects/symptoms:

AFTER SKIN CONTACT
- Slight irritation

11.5 Chronic effects:

- Probably human carcinogenic
- No certainty about human mutagenic properties

ON CONTINUOUS/REPEATED EXPOSURE/CONTACT:
- No specific information available

SIMILAR PRODUCTS CAUSE FOLLOWING SYMPTOMS:
- Feeling of weakness
- Photoallergy
- Cracking of the skin
- Skin rash/inflammation
- Skin cancer
- Lung tissue affection/degeneration
- Enlargement/affection of the liver
- Affection of the renal tissue

12. Ecological information

12.1 Ecotoxicity:

- LC50 (24 h) : 0.0007 mg/l (DAPHNIA MAGNA)
- LC50 (24 h) : >6.7 mg/l (RANA SP.)

12.2 Mobility:

- **Volatile organic compounds (VOC):** N.D.%

- Forming sediments in water
- Adsorbs into the soil
- Insoluble in water

For other physicochemical properties see heading 9.

12.3 Persistence and degradability:

- **biodegradation BOD_5** : N.D. **% ThOD**
- **water** : - Not readily biodegradable in water
- **soil** : **T ½:** > 77 **days**

12.4 Bioaccumulative potential:
- **log P_{ow}** : 5.61/5.73
- **BCF** : 4440 (LAMELLIBRANCHIATA)
- Highly bioaccumulative

12.5 Other adverse effects:

- **WGK** : 3 (Classification based on the R-phrases in compliance with Verwaltungsvorschrift wassergefährdender Stoffe (VwVwS) of 17 May 1999)
- **Effect on the ozone layer** : Not dangerous for the ozone layer (Council Regulation (EC) 3093/94)
- **Greenhouse effect** : no data available
- **Effect on waste water purification** : no data available

13. Disposal considerations

13.1 Provisions relating to waste:

- Waste material code (91/689/EEC, Council Decision
- 2001/118/EC, O.J. L47 of 16/2/2001): 16 05 06 (laboratory chemicals, consisting of or containing dangerous substances, including mixtures of laboratory)
- Waste material code (Flanders): 001, 045, 691
- Waste code (Germany): 59302
- Hazardous waste (91/689/EEC)

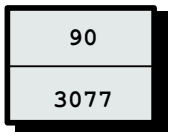
13.2 Disposal methods:

- Dissolve or mix with a combustible solvent
- Remove to an authorized incinerator equipped with an afterburner and a flue gas scrubber
- Do not discharge into surface water (2000/60/EEC, Council

13.3 Packaging/Container:

- Waste material code packaging (91/689/EEC, Council Decision
- 2001/118/EC, O.J. L47 of 16/2/2001): 15 01 10 (packaging containing residues of or contaminated by dangerous substances)

14. Transport information



14.1 Classification of the substance in compliance with UN Recommendations

UN number	: 3077
CLASS	: 9
SUB RISKS	: -
PACKING	: III
PROPER SHIPPING NAME	: UN 3077, Environmentally hazardous substance, solid, n.o.s. (chrysene)

14.2 ADR (transport by road)

CLASS	: 9
PACKING	: III
DANGER LABEL TANKS	: 9
DANGER LABEL PACKAGES	: 9

14.3 RID (transport by rail)

CLASS	: 9
PACKING	: III
DANGER LABEL TANKS	: 9
DANGER LABEL PACKAGES	: 9

14.4 ADNR (transport by inland waterways)

CLASS	: 9
PACKING	: III
DANGER LABEL TANKS	: 9
DANGER LABEL PACKAGES	: 9

14.5 IMDG (maritime transport)

CLASS	: 9
SUB RISKS	: -
PACKING	: III
MFAG	: -
EMS	: -
MARINE POLLUTANT	: P

14.6 ICAO (air transport)

CLASS	: 9
SUB RISKS	: -
PACKING	: III
PACKING INSTRUCTIONS PASSENGER AIRCRAFT	:
PACKING INSTRUCTIONS CARGO AIRCRAFT	:

14.7 Special precautions in connection with transport : none

14.8 Limited quantities (LQ) :

When substances and their packaging meet the conditions established by ADR/RID/ADNR in chapter 3.4, **only** the following prescriptions shall be complied with:
each package shall display a diamond-shaped figure with the following inscription:
- 'UN 3077'
or, in the case of different goods with different identification numbers within a single package:
- the letters 'LQ'

15. Regulatory information

Enumerated in substance list Annex I of directive 67/548/EEC et sequens

Toxic

Dangerous for the environment

R45 : May cause cancer
R50/53 : Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

S53 : Avoid exposure - obtain special instructions before use
S45 : In case of accident or if you feel unwell, seek medical advice (show the label where possible)
S60 : This material and/or its container must be disposed of as hazardous waste
S61 : Avoid release to the environment. Refer to special instructions/safety data sheets.

16. Other information

The information provided on this MSDS is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

N.A. = NOT APPLICABLE
N.D. = NOT DETERMINED
***** = INTERNAL CLASSIFICATION

Full text of any R-phrases referred to under heading 2:

R45 : May cause cancer
R50/53 : Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

Exposure limits:
TLV : Threshold Limit Value - ACGIH USA 2000
OES : Occupational Exposure Standards - United Kingdom 1999
MEL : Maximum Exposure Limits - United Kingdom 1999
MAK : Maximale Arbeitsplatzkonzentrationen - Germany 2001
TRK : Technische Richtkonzentrationen - Germany 2001
MAC : Maximale aanvaarde concentratie - The Netherlands 2002
VME : Valeurs limites de Moyenne d'Exposition - France 1999
VLE : Valeurs limites d'Exposition à court terme - France 1999
GWBB : Grenswaarde beroepsmatige blootstelling - Belgium 1998
GWK : Grenswaarde kortstondige blootstelling - Belgium 1998
EC : Indicative occupational exposure limit values - directive 2000/39/EC

Chronic toxicity:
K : List of the carcinogenic substances and processes - The Netherlands 2002

SAFETY DATA SHEET

Version 5.4
Revision Date 12/01/2015
Print Date 03/03/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : *cis*-1,2-Dichloroethylene

Product Number : D62004
Brand : Aldrich
Index-No. : 602-026-00-3

CAS-No. : 156-59-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 2), H225
Acute toxicity, Inhalation (Category 4), H332
Acute aquatic toxicity (Category 3), H402
Chronic aquatic toxicity (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H225 Highly flammable liquid and vapour.
H332 Harmful if inhaled.
H412 Harmful to aquatic life with long lasting effects.

Precautionary statement(s)
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P233 Keep container tightly closed.
P240 Ground/bond container and receiving equipment.
P241 Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242 Use only non-sparking tools.

P243	Take precautionary measures against static discharge.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P312	Call a POISON CENTER or doctor/ physician if you feel unwell.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P403 + P235	Store in a well-ventilated place. Keep cool.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	cis-Acetylene dichloride
Formula	:	$C_2H_2Cl_2$
Molecular weight	:	96.94 g/mol
CAS-No.	:	156-59-2
EC-No.	:	205-859-7
Index-No.	:	602-026-00-3

Hazardous components

Component	Classification	Concentration
cis-Dichloroethylene		
	Flam. Liq. 2; Acute Tox. 4; Aquatic Acute 3; Aquatic Chronic 3; H225, H332, H412	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Use explosion-proof equipment.Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Handle and store under inert gas. Air and moisture sensitive. Light sensitive.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
cis-Dichloroethylene	156-59-2	TWA	200 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Central Nervous System impairment Eye irritation		

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Colour: light yellow
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -80 °C (-112 °F) - lit.
f)	Initial boiling point and boiling range	60 °C (140 °F) - lit.
g)	Flash point	6.0 °C (42.8 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	1.284 g/cm3 at 25 °C (77 °F)
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available

p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Vapours may form explosive mixture with air.

10.4 Conditions to avoid
Heat, flames and sparks. Extremes of temperature and direct sunlight.

10.5 Incompatible materials
Oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LC50 Inhalation - Rat - 13700 ppm
Remarks: Behavioral:Somnolence (general depressed activity). Liver:Fatty liver degeneration.

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: KV9420000

narcosis, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Harmful to aquatic life.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1150 Class: 3 Packing group: II
Proper shipping name: 1,2-Dichloroethylene

Poison Inhalation Hazard: No

IMDG
UN number: 1150 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: 1,2-DICHLOROETHYLENE

IATA
UN number: 1150 Class: 3 Packing group: II
Proper shipping name: 1,2-Dichloroethylene

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Fire Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
cis-Dichloroethylene	156-59-2	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
cis-Dichloroethylene	156-59-2	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
cis-Dichloroethylene	156-59-2	1993-04-24

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Flam. Liq.	Flammable liquids
H225	Highly flammable liquid and vapour.
H332	Harmful if inhaled.
H402	Harmful to aquatic life.

HMIS Rating

Health hazard:	1
Chronic Health Hazard:	*
Flammability:	3
Physical Hazard	1

NFPA Rating

Health hazard:	2
Fire Hazard:	3
Reactivity Hazard:	0

Further information
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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information
Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.4 Revision Date: 12/01/2015 Print Date: 03/03/2016

SAFETY DATA SHEET

Version 4.6
Revision Date 01/26/2016
Print Date 04/01/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : α-Chlordane

Product Number : 442449
Brand : Supelco

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 4), H302
Acute toxicity, Inhalation (Category 4), H332
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)
H302 + H332 Harmful if swallowed or if inhaled
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264 Wash skin thoroughly after handling.

P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear eye protection/ face protection.
P280	Wear protective gloves.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell. Rinse mouth.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P312	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Molecular weight : 208.29 g/mol
EC-No. : 225-825-5

Hazardous components

Component	Classification	Concentration
Chlordane		
	Acute Tox. 4; Skin Irrit. 2; Eye Irrit. 2A; STOT SE 3; Aquatic Acute 1; Aquatic Chronic 1; H302 + H332, H315, H319, H335, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.
Storage class (TRGS 510): Non Combustible Solids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator.For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: crystalline Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	93.0 - 94.0 °C (199.4 - 201.2 °F)
f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	No data available

n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 500 mg/kg

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Chlordane)

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: Not available

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Lepomis macrochirus (Bluegill) - 0.0074 mg/l - 96 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential

Bioaccumulation	Lepomis macrochirus (Bluegill) - 24 h - 0.005 mg/l
	Bioconcentration factor (BCF): 322

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (Chlordane)
Reportable Quantity (RQ): 1 lbs
Marine pollutant:yes
Poison Inhalation Hazard: No

IMDG
UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Chlordane)
Marine pollutant:yes
IATA
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Chlordane)

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Chlordane	5103-71-9	

New Jersey Right To Know Components

	CAS-No.	Revision Date
Chlordane	5103-71-9	

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Eye Irrit.	Eye irritation
H302	Harmful if swallowed.
H302 + H332	Harmful if swallowed or if inhaled
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.6 Revision Date: 01/26/2016 Print Date: 04/01/2016

SAFETY DATA SHEET

Issue Date 28-May-2015 **Revision Date** 18-Nov-2016 **Version** 4

Section 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. Product identifier

Product Code SM002
Product Name Cobalt-Base Alloy

Synonyms Non-powder forms of ATI 35N, ATI L-605, and ATI TJA-1537®
Contains Cobalt, Nickel

1.2. Relevant identified uses of the substance or mixture and uses advised against

Recommended Use Cobalt alloy product manufacture

Uses advised against

1.3. Details of the supplier of the safety data sheet

Manufacturer Address
ATI, 1000 Six PPG Place, Pittsburgh, PA 15222 USA

1.4. Emergency telephone number

Emergency Telephone Chemtrec: +1-703-741-5970

Section 2: HAZARDS IDENTIFICATION

This product is an article and, as such, does not present a hazard to human health by inhalation or ingestion

2.1. Classification of the substance or mixture

Regulation (EC) No 1272/2008

Acute toxicity - Oral	Category 4
Respiratory sensitisation	Category 1B
Skin sensitisation	Category 1
Carcinogenicity	Category 1B
Reproductive toxicity	Category 2
Specific target organ toxicity (repeated exposure)	Category 1
Chronic aquatic toxicity	Category 4

2.2. Label elements

Emergency Overview

Danger

Hazard statements
Harmful if swallowed
May cause allergy or asthma symptoms or breathing difficulties if inhaled.
May cause an allergic skin reaction
May cause cancer
Suspected of damaging fertility or the unborn child
Causes damage to the respiratory tract through prolonged or repeated exposure if inhaled
May cause long lasting harmful effects to aquatic life

Appearance Various massive product forms | **Physical state** Solid | **Odour** Odourless

Precautionary Statements - Prevention
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wear protective gloves

If skin irritation or rash occurs: Get medical advice/attention
If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell

Precautionary Statements - Disposal
Dispose of contents/container to an approved waste disposal plant

2.3 Hazards not otherwise classified (HNOC)
Not applicable
Other Information
When product is subjected to welding, burning, melting, sawing, brazing, grinding, buffing, polishing, or other similar heat-generating processes, the following potentially hazardous airborne particles and/or fumes may be generated: Hexavalent Chromium (Chromium VI) may cause lung, nasal, and/or sinus cancer, Soluble molybdenum compounds such as molybdenum trioxide may cause lung irritation.

Section 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms Non-powder forms of ATI 35N, ATI L-605, and ATI TJA-1537®.

Chemical Name	EC No	CAS No	Weight-%
Cobalt	213-158-0	7440-48-4	35-70
Chromium	231-157-5	7440-47-3	20-30
Nickel	231-111-4	7440-02-0	0-25
Tungsten	231-143-9	7440-33-7	0 - 15
Molybdenum	231-107-2	7439-98-7	0 - 10
Manganese	231-105-1	7439-96-5	0 - 5
Iron	231-096-4	7439-89-6	0 - 5

Section 4: FIRST AID MEASURES

4.1. Description of first aid measures

Inhalation If excessive amounts of smoke, fume, or particulate are inhaled during processing, remove to fresh air and consult a qualified health professional.

Skin Contact In the case of skin irritation or allergic reactions see a doctor.

Eye contact In the case of particles coming in contact with eyes during processing, treat as with any foreign object.

Ingestion Not an expected route of exposure.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms May cause allergic skin reaction. May cause acute gastrointestinal effects if swallowed.

4.3. Indication of any immediate medical attention and special treatment needed

Note to doctors Treat symptomatically.

Section 5: FIRE FIGHTING MEASURES

5.1. Extinguishing media

Suitable extinguishing media
None in massive form, flammable as finely divided particles. Smother with salt (NaCl) or class D dry powder fire extinguisher.

Unsuitable extinguishing media
Do not spray water on burning metal as an explosion may occur. This explosive characteristic is caused by the hydrogen and steam generated by the reaction of water with the burning material

5.2. Special hazards arising from the substance or mixture

Intense heat. Very fine, high surface area material resulting from grinding, buffing, polishing, or similar processes of this product may ignite spontaneously at room temperature. WARNING: Fine particles resulting from grinding, buffing, polishing, or similar processes of this product may form combustible dust-air mixtures. Keep particles away from all ignition sources including heat, sparks, and flame. Prevent dust accumulations to minimise combustible dust hazard.

Hazardous combustion products Hexavalent Chromium (Chromium VI) may cause lung, nasal, and/or sinus cancer, Soluble molybdenum compounds such as molybdenum trioxide may cause lung irritation.

5.3. Advice for firefighters

Wear self-contained breathing apparatus and protective suit. Use personal protective equipment as required.

Section 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions
Use personal protective equipment as required.

For emergency responders
Use personal protective equipment as required.

6.2. Environmental precautions

Not applicable to massive product.

6.3. Methods and material for containment and cleaning up

Methods for containment Not applicable to massive product.

Methods for cleaning up Not applicable to massive product.

6.4. Reference to other sections

See Section 12: ECOLOGICAL INFORMATION.

Section 7: HANDLING AND STORAGE

7.1. Precautions for safe handling

Advice on safe handling
Very fine, high surface area material resulting from grinding, buffing, polishing, or similar processes of this product may ignite spontaneously at room temperature. WARNING: Fine particles resulting from grinding, buffing, polishing, or similar processes of this product may form combustible dust-air mixtures. Keep particles away from all ignition sources including heat, sparks, and flame. Prevent dust accumulations to minimise combustible dust hazard.

General Hygiene Considerations
Handle in accordance with good industrial hygiene and safety practice.

7.2. Conditions for safe storage, including any incompatibilities

Storage Conditions
Keep chips, turnings, dust, and other small particles away from heat, sparks, flame and other sources of ignition (i.e., pilot lights, electric motors and static electricity).

Incompatible materials
Dissolves in hydrofluoric acid.

7.3. Specific end use(s)

Risk Management Methods (RMM)
The information required is contained in this Safety Data Sheet.

Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

Chemical Name	European Union	United Kingdom	France	Spain	Germany
Cobalt 7440-48-4	-	STEL: 0.3 mg/m³ TWA: 0.1 mg/m³	-	TWA: 0.02 mg/m³	Skin
Chromium 7440-47-3	TWA: 2 mg/m³	STEL: 1.5 mg/m³ TWA: 0.5 mg/m³	TWA: 2 mg/m³	TWA: 2 mg/m³	TWA: 2 mg/m³
Nickel 7440-02-0	-	STEL: 1.5 mg/m³ TWA: 0.5 mg/m³	TWA: 1 mg/m³	TWA: 1 mg/m³	Skin
Tungsten 7440-33-7	-	STEL: 10 mg/m³ TWA: 5 mg/m³	-	STEL: 10 mg/m³ TWA: 5 mg/m³	-
Molybdenum 7439-98-7	-	-	-	TWA: 10 mg/m³ TWA: 3 mg/m³	-
Manganese 7439-96-5	-	STEL: 1.5 mg/m³ TWA: 0.5 mg/m³	TWA: 1 mg/m³	TWA: 0.2 mg/m³	TWA: 0.2 mg/m³ TWA: 0.02 mg/m³ Ceiling / Peak: 1.6 mg/m³ Ceiling / Peak: 0.16 mg/m³ TWA: 0.5 mg/m³
Iron 7439-89-6	-	-	-	-	-

Chemical Name	Italy	Portugal	Netherlands	Finland	Denmark
Cobalt 7440-48-4	-	TWA: 0.02 mg/m³	TWA: 0.02 mg/m³	TWA: 0.02 mg/m³	TWA: 0.01 mg/m³
Chromium 7440-47-3	TWA: 0.5 mg/m³	TWA: 0.5 mg/m³	TWA: 0.5 mg/m³	TWA: 0.5 mg/m³	TWA: 0.5 mg/m³
Nickel 7440-02-0	-	TWA: 1.5 mg/m³	-	TWA: 1 mg/m³ TWA: 0.1 mg/m³	TWA: 0.05 mg/m³
Tungsten 7440-33-7	-	STEL: 10 mg/m³ TWA: 5 mg/m³	-	TWA: 5 mg/m³	TWA: 5 mg/m³
Molybdenum 7439-98-7	-	TWA: 10 mg/m³ TWA: 3 mg/m³	-	TWA: 0.5 mg/m³	-
Manganese 7439-96-5	-	TWA: 0.2 mg/m³	-	TWA: 0.2 mg/m³ TWA: 0.1 mg/m³	TWA: 0.2 mg/m³ TWA: 0.1 mg/m³
Iron 7439-89-6	-	-	-	-	-

Chemical Name	Austria	Switzerland	Poland	Norway	Ireland

Cobalt 7440-48-4	Skin	Skin TWA: 0.05 mg/m³	STEL: 0.2 mg/m³ TWA: 0.02 mg/m³	TWA: 0.02 mg/m³ STEL: 0.06 mg/m³	TWA: 0.1 mg/m³
Chromium 7440-47-3	TWA: 2 mg/m³	TWA: 0.5 mg/m³	TWA: 0.5 mg/m³	TWA: 0.5 mg/m³ STEL: 1.5 mg/m³	TWA: 2 mg/m³
Nickel 7440-02-0	-	TWA: 0.5 mg/m³	TWA: 0.25 mg/m³	TWA: 0.05 mg/m³ STEL: 0.15 mg/m³	TWA: 0.5 mg/m³
Tungsten 7440-33-7	STEL 10 mg/m³ TWA: 5 mg/m³	TWA: 5 mg/m³	TWA: 5 mg/m³	TWA: 5 mg/m³ STEL: 10 mg/m³	TWA: 5 mg/m³ STEL: 10 mg/m³
Molybdenum 7439-98-7	STEL 20 mg/m³ TWA: 10 mg/m³	TWA: 10 mg/m³	STEL: 10 mg/m³ TWA: 4 mg/m³	-	TWA: 0.5 mg/m³
Manganese 7439-96-5	STEL 2 mg/m³ TWA: 0.5 mg/m³	TWA: 0.5 mg/m³	TWA: 0.3 mg/m³	TWA: 1 mg/m³ TWA: 0.1 mg/m³ STEL: 3 ppm STEL: 0.3 mg/m³	TWA: 0.2 mg/m³ STEL: 3 mg/m³
Iron 7439-89-6	-	-	-	-	-

Derived No Effect Level (DNEL) No DNELs are available for this product as a whole

Predicted No Effect Concentration (PNEC) No PNECs are available for this product as a whole.

8.2. Exposure controls

Engineering Controls Avoid generation of particulates.

Personal protective equipment

Eye/face protection When airborne particles may be present, appropriate eye protection is recommended. For example, tight-fitting goggles, foam-lined safety glasses or other protective equipment that shield the eyes from particles.

Skin and body protection Wear fire/flame resistant/retardant clothing. Cut-resistant gloves and/or protective clothing may be appropriate when sharp surfaces are present.

Respiratory protection When particulates/fumes/gases are generated and if exposure limits are exceeded or irritation is experienced, proper approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminate concentrations. Respiratory protection must be provided in accordance with current local regulations.

Environmental exposure controls Section 6: ACCIDENTAL RELEASE MEASURES.

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

Physical state	Solid		
Appearance	Various massive product forms	**Odour**	Odourless
Colour	metallic grey Silver	**Odour threshold**	Not applicable

Property	**Values**	**Remarks • Method**
pH	-	
Melting point/freezing point	1420 - 1450 °C / 2590 - 2650 °F	
Boiling point / boiling range	-	Not applicable
Flash point	-	Not applicable
Evaporation rate	-	Not applicable
Flammability (solid, gas)	-	None in massive form, flammable as finely divided particles
Flammability Limit in Air		
Upper flammability limit:		-
Lower flammability limit		-
Vapour pressure	-	Not applicable
Vapour density	-	Not applicable
Specific Gravity	7-9	
Water solubility	Insoluble	Not applicable
Solubility(ies)		Not applicable

Partition coefficient	-	Not applicable
Autoignition temperature	-	Not applicable
Decomposition temperature	-	Not applicable
Kinematic viscosity	-	Not applicable
Dynamic viscosity	-	Not applicable
Explosive properties	Not applicable	
Oxidising properties	Not applicable	

9.2. Other information

Softening point	-
Molecular weight	-
VOC Content (%)	Not applicable
Density	-
Bulk density	-

Section 10: STABILITY AND REACTIVITY

10.1. Reactivity

Not applicable .

10.2. Chemical stability

Stable under normal conditions.

Explosion data

Sensitivity to Mechanical Impact	None.
Sensitivity to Static Discharge	None.

10.3. Possibility of hazardous reactions

Hazardous polymerisation
Hazardous polymerisation does not occur.

Possibility of Hazardous Reactions
None under normal processing.

10.4. Conditions to avoid

Dust formation and dust accumulation.

10.5. Incompatible materials

Dissolves in hydrofluoric acid.

10.6. Hazardous decomposition products

When product is subjected to welding, burning, melting, sawing, brazing, grinding, buffing, polishing, or other similar heat-generating processes, the following potentially hazardous airborne particles and/or fumes may be generated: Hexavalent Chromium (Chromium VI) may cause lung, nasal, and/or sinus cancer, Soluble molybdenum compounds such as molybdenum trioxide may cause lung irritation.

Section 11: TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

Product Information

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Inhalation	Not an expected route of exposure for product in massive form.
Eye contact	Not an expected route of exposure for product in massive form.
Skin Contact	May cause sensitisation by skin contact.
Ingestion	Not an expected route of exposure for product in massive form.

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
Cobalt	550 mg/kg bw	>2000 mg/kg bw	<0.05 mg/L
Chromium	> 3400 mg/kg bw	-	> 5.41 mg/L
Nickel	> 9000 mg/kg bw	-	> 10.2 mg/L
Tungsten	> 2000 mg/kg bw	> 2000 mg/kg bw	> 5.4 mg/L
Molybdenum	> 2000 mg/kg bw	> 2000 mg/kg bw	> 5.10 mg/L
Manganese	>2000 mg/kg bw	-	>5.14 mg/L
Iron	98,600 mg/kg bw	-	> 0.25 mg/L

Information on toxicological effects

Symptoms May cause sensitisation by skin contact. May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause acute gastrointestinal effects if swallowed.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Acute toxicity Harmful if swallowed. Cobalt-containing powders may be fatal if inhaled.

Skin corrosion/irritation Product not classified.

Serious eye damage/eye irritation Product not classified.

Sensitisation May cause sensitisation by skin contact. Cobalt-containing alloys may cause sensitization by inhalation.

Germ cell mutagenicity Product not classified.

Carcinogenicity May cause cancer by inhalation.

Chemical Name	ACGIH	IARC	NTP	OSHA
Cobalt 7440-48-4	A3	Group 2A Group 2B	Known	X
Chromium 7440-47-3		Group 3		
Nickel 7440-02-0		Group 1 Group 2B	Known Reasonably Anticipated	X

Reproductive toxicity Possible risk of impaired fertility.

STOT - single exposure Product not classified.

STOT - repeated exposure Causes disorder and damage to the: Respiratory System.

Aspiration hazard Product not classified.

Section 12: ECOLOGICAL INFORMATION

12.1. Toxicity

This product as shipped is classified for aquatic chronic toxicity

Chemical Name	Algae/aquatic plants	Fish	Toxicity to Micro-organisms	Crustacea
Cobalt	The 72 h EC50 of cobalt dichloride to Pseudokirchneriella subcapitata was 144 ug of Co/L.	The 96h LC50 of cobalt dichloride ranged from 1.5 mg Co/L for Oncorhynchus mykiss to 85 mg Co/L for Danio rerio.	The 3 h EC50 of cobalt dichloride for activated sludge was 120 mg of Co/L.	The 48 h LC50 of cobalt dichloride ranged from 0.61 mg Co/L for Ceriodaphnia dubia tested in soft, DOM-free water to >1800mg Co/L for Tubifex tubifex in very hard water.
Chromium	-	-	-	-
Nickel	NOEC/EC10 values range from 12.3 µg/l for	The 96h LC50s values range from 0.4 mg Ni/L for	The 30 min EC50 of nickel for activated sludge was	The 48h LC50s values range from 0.013 mg Ni/L

	Scenedesmus accuminatus to 425 µg/l for Pseudokirchneriella subcapitata.	Pimephales promelas to 320 mg Ni/L for Brachydanio rerio.	33 mg Ni/L.	for Ceriodaphnia dubia to 4970 mg Ni/L for Daphnia magna.
Tungsten	The 72 h EC50 of sodium tungstate to Pseudokirchnerella subcapitata was 31.0 mg of W/L.	The 96 h LC50 of sodium tungstate to Danio rerio was greater than 106 mg of W/L.	The 30 min EC50 of sodium tungstate for activated sludge were greater than 1000 mg/L.	The 48 h EC50 of sodium tungstate to Daphnia magna was greater than 96 mg of W/L.
Molybdenum	The 72 h EC50 of sodium molybdate dihydrate to Pseudokirchneriella subcapitata was 362.9 mg of Mo/L.	The 96 h LC50 of sodium molybdate dihydrate to Pimephales promelas was 644.2 mg/L	The 3 h EC50 of molybdenum trioxide for activated sludge was 820 mg/L.	The 48 h LC50 of sodium molybdate dihydrate to Ceriodaphnia dubia was 1,015 mg/L. The 48 h LC50 of sodium molybdate dihydrate to Daphnia magna was greater than 1,727.8 mg/L.
Manganese	The 72 h EC50 of manganese to Desmodesmus subspicatus was 2.8 mg of Mn/L.	The 96 h LC50 of manganese to Oncorhynchus mykiss was greater than 3.6 mg of Mn/L	The 3 h EC50 of manganese for activated sludge was greater than 1000 mg/L.	The 48 h EC50 of manganese to Daphnia magna was greater than 1.6 mg/L.
Iron	-	The 96 h LC50 of 50% iron oxide black in water to Danio rerio was greater than 10,000 mg/L.	The 3 h EC50 of iron oxide for activated sludge was greater than 10,000 mg/L.	The 48 h EC50 of iron oxide to Daphnia magna was greater than 100 mg/L.

12.2. Persistence and degradability

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12.3. Bioaccumulative potential

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12.4. Mobility in soil

12.5. Results of PBT and vPvB assessment

The PBT and vPvB criteria do not apply to inorganic substances.

12.6. Other adverse effects

This product as shipped is not classified for acute environmental endpoints. However, when subjected to sawing or grinding, particles may be generated that are classified for aquatic acute toxicity

Section 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Waste from residues/unused products Disposal should be in accordance with applicable regional, national and local laws and regulations.

Contaminated packaging None anticipated.

Section 14: TRANSPORT INFORMATION

IMDG

14.1 UN/ID no Not regulated
14.2 Proper shipping name Not regulated
14.3 Hazard Class Not regulated
14.4 Packing Group Not regulated
14.5 Marine pollutant Not applicable
14.6 Special Provisions None

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not applicable

RID

14.1 UN/ID no Not regulated
14.2 Proper shipping name Not regulated
14.3 Hazard Class Not regulated
14.4 Packing Group Not regulated
14.5 Environmental hazard Not applicable
14.6 Special Provisions None

ADR

14.1 UN/ID no Not regulated
14.2 Proper shipping name Not regulated
14.3 Hazard Class Not regulated
14.4 Packing Group Not regulated
14.5 Environmental hazard Not applicable
14.6 Special Provisions None

ICAO (air)

14.1 UN/ID no Not regulated
14.2 Proper shipping name Not regulated
14.3 Hazard Class Not regulated
14.4 Packing Group Not applicable
14.5 Environmental hazard Not applicable
14.6 Special Provisions None

IATA

14.1 UN/ID no Not regulated
14.2 Proper shipping name Not regulated
14.3 Hazard Class Not regulated
14.4 Packing Group Not regulated
Description Not applicable
14.5 Environmental hazard Not applicable
14.6 Special Provisions None

Section 15: REGULATORY INFORMATION

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

Chemical Name	French RG number	Title
Cobalt 7440-48-4	RG 65,RG 70,RG 70bis,RG 70ter	-
Chromium 7440-47-3	RG 10	-
Nickel 7440-02-0	RG 37ter	-
Tungsten 7440-33-7	-	-
Molybdenum 7439-98-7	-	-
Manganese 7439-96-5	-	-
Iron 7439-89-6	RG 44,RG 44bis,RG 94	-

European Union

Take note of Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work

Authorisations and/or restrictions on use:
This product does not contain substances subject to authorisation (Regulation (EC) No. 1907/2006 (REACH), Annex XIV). This product does not contain substances subject to restriction (Regulation (EC) No. 1907/2006 (REACH), Annex XVII).

International Inventories

DSL/NDSL	Complies
EINECS/ELINCS	Complies
ENCS	Complies
IECSC	Complies
KECL	Complies
PICCS	Complies
AICS	Complies

Legend:
TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
AICS - Australian Inventory of Chemical Substances

15.2. Chemical safety assessment

No chemical safety assessment has been performed for this product.

Section 16: OTHER INFORMATION

Issue Date	28-May-2015
Revision Date	18-Nov-2016
Revision Note	Updated Section(s): 2.

This material safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006

Note:
The information provided in this Material Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

End of Safety Data Sheet

Additional information available from:	Safety data sheets and labels available at ATImetals.com

COBALT-BASED ALLOYS

⚠ WARNING

Physical Hazards: Non-combustible as supplied. Dust and fines from processing may be ignitable. Explosion/fire hazards may be present when (1) molten metal is in contact with water or moisture or (2) heavily concentrated dust clouds are dispersed in air.

Health Hazards: Health effects generally expected in cases of overexposures:

EYES: Dust or fume from processing: Can cause irritation.

SKIN: Dust or fume from processing: Can cause irritation, sensitization and allergic contact dermatitis.

INHALATION: Health effects from mechanical processing (e.g., cutting, grinding): Can cause upper respiratory tract irritation. **Chronic overexposures:** Can cause asthma, respiratory sensitization, scarring of the lungs (pulmonary fibrosis), central nervous system damage, secondary Parkinson's disease and reproductive harm in males. Additional health effects from elevated temperature processing (e.g., welding, melting): **Acute overexposures:** Can cause nausea, fever, chills, shortness of breath and malaise (metal fume fever). **Chronic overexposures:** Can cause the accumulation of fluid in the lungs (pulmonary edema) and lung cancer.

WARNING: Cobalt metal powder, Chromium (hexavalent compounds) and nickel (metallic) and nickel compounds are chemicals known to the State of California to cause cancer (Proposition 65).

Precautions: Avoid generating dust. Use with adequate ventilation. Keep material dry. Use appropriate personal protective equipment (safety glasses/gloves) to avoid injury. Use appropriate NIOSH approved respiratory protection (N95) if concentrations exceed the permissible limits.

First Aid (dust or fume from processing): EYES: Flush eyes with plenty of water or saline for at least 15 minutes. Consult a physician. SKIN: Wash skin with soap and water for at least 15 minutes. Consult a physician if irritation persists. INHALATION: Remove to fresh air. If unconscious or severely injured, check for clear airway, breathing and presence of pulse. Perform CPR if there is no pulse or respiration. Consult a physician.

In case of fire: Use a Class D agent, fluxing salts, graphite or dry sand on dust or fine fires. Otherwise, use fire fighting methods and materials that are appropriate for surrounding fire. Do NOT use water around molten metal. This will react with the burning material.

Read Alcoa Material Safety Data Sheet No. 1147 for more information about use and disposal.

Emergency Phone: (412) 553-4001.

INGREDIENTS:	CAS No:	INGREDIENTS:	CAS No:
Cobalt	(7440-48-4)	Vanadium	(7440-62-2)
Chromium	(7440-47-3)	Manganese	(7439-96-5)
Nickel	(7440-02-0)	Aluminum	(7429-90-5)
Tungsten	(7440-33-7)	Niobium	(7440-03-1)
Iron	(7439-89-6)	Silicon	(7440-21-3)
Molybdenum	(7439-98-7)	Carbon	(7440-44-0)
Tantalum	(7440-25-7)		

Alcoa Inc.
201 Isabella Street, Pittsburgh, PA 15212-5858 USA

ALCOA

4/08 1147

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ERROR: undefined
OFFENDING COMMAND: get

STACK:

/quit
-dictionary-
-mark-
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SAFETY DATA SHEET

Version 4.8
Revision Date 12/01/2015
Print Date 05/13/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Cumene

Product Number : 36698
Brand : Sigma-Aldrich
Index-No. : 601-024-00-X

CAS-No. : 98-82-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 3), H226
Carcinogenicity (Category 2), H351
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Aspiration hazard (Category 1), H304
Acute aquatic toxicity (Category 2), H401
Chronic aquatic toxicity (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H226 Flammable liquid and vapour.
H304 May be fatal if swallowed and enters airways.
H335 May cause respiratory irritation.
H351 Suspected of causing cancer.
H411 Toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P201 Obtain special instructions before use.

P202	Do not handle until all safety precautions have been read and understood.
P210	Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P331	Do NOT induce vomiting.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

May form explosive peroxides.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	Isopropylbenzene
Formula	:	C_9H_{12}
Molecular weight	:	120.19 g/mol
CAS-No.	:	98-82-8
EC-No.	:	202-704-5
Index-No.	:	601-024-00-X

Hazardous components

Component	Classification	Concentration
Cumene		
	Flam. Liq. 3; Carc. 2; STOT SE 3; Asp. Tox. 1; Aquatic Acute 2; Aquatic Chronic 2; H226, H304, H335, H351, H411	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Cumene	98-82-8	TWA	50.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Skin irritation		
		TWA	50.000000 ppm 245.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential for dermal absorption		
		TWA	50.000000 ppm 245.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Skin designation The value in mg/m3 is approximate.		

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 30 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid, clear Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -96 °C (-141 °F) - lit.
f)	Initial boiling point and boiling range	152 - 154 °C (306 - 309 °F) - lit.
g)	Flash point	31.0 °C (87.8 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 6.5 %(V) Lower explosion limit: 0.9 %(V)
k)	Vapour pressure	10.7 hPa (8.0 mmHg) at 20.0 °C (68.0 °F)
l)	Vapour density	No data available
m)	Relative density	0.864 g/cm3 at 25 °C (77 °F)
n)	Water solubility	0.06 g/l at 25 °C (77 °F) - slightly soluble
o)	Partition coefficient: n-octanol/water	log Pow: 3.55 at 23 °C (73 °F)
p)	Auto-ignition temperature	425.0 °C (797.0 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Surface tension	27.69 mN/m at 25 °C (77 °F)

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.
Test for peroxide formation before distillation or evaporation. Test for peroxide formation or discard after 1 year.

10.3 Possibility of hazardous reactions
Vapours may form explosive mixture with air.

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - male - 2,260 mg/kg

Inhalation: No data available

Dermal: No data available

NOAEL Feed - Rat - male - > 535.8 mg/kg

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation
(OECD Test Guideline 405)

Respiratory or skin sensitisation
- Guinea pig
Result: Did not cause sensitisation on laboratory animals.
(OECD Test Guideline 406)

Germ cell mutagenicity
in vitro assay
S. typhimurium
Result: negative

Mutagenicity (micronucleus test)
Mouse - male and female
Result: negative

Carcinogenicity

IARC:	2B - Group 2B: Possibly carcinogenic to humans (Cumene)
NTP:	Reasonably anticipated to be a human carcinogen (Cumene)
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
May cause respiratory irritation.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
May be fatal if swallowed and enters airways.

Additional Information
RTECS: GR8575000

narcosis, Central nervous system depression, Dermatitis, Gastrointestinal disturbance, Damage to the lungs., Liver injury may occur., Kidney injury may occur.

Stomach - Irregularities - Based on Human Evidence
Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 4.8 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia (water flea) - 2.14 mg/l - 48 h (OECD Test Guideline 202)
Toxicity to algae	EC50 - Pseudokirchneriella subcapitata (green algae) - 2.60 mg/l - 72 h

12.2 Persistence and degradability

Biodegradability Result: - According to the results of tests of biodegradability this product is not readily biodegradable.

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1918 Class: 3 Packing group: III
Proper shipping name: Isopropylbenzene
Reportable Quantity (RQ): 5000 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 1918 Class: 3 Packing group: III EMS-No: F-E, S-E
Proper shipping name: ISOPROPYLBENZENE
Marine pollutant:yes
IATA

UN number: 1918 Class: 3 Packing group: III
Proper shipping name: Isopropylbenzene

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Cumene	98-82-8	2007-07-01

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Cumene	98-82-8	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Cumene	98-82-8	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Cumene	98-82-8	2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No.	Revision Date
Cumene	98-82-8	2010-06-11

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Asp. Tox.	Aspiration hazard
Carc.	Carcinogenicity
Flam. Liq.	Flammable liquids
H226	Flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H335	May cause respiratory irritation.
H351	Suspected of causing cancer.
H401	Toxic to aquatic life.
H411	Toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	3
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	3
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.8 Revision Date: 12/01/2015 Print Date: 05/13/2016

SAFETY DATA SHEET

Version 7.1
Revision Date 09/07/2024
Print Date 09/08/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Cyanide Standard for IC

Product Number : 90157
Brand : Sigma-Aldrich

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Short-term (acute) aquatic hazard (Category 3), H402
Long-term (chronic) aquatic hazard (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

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Pictogram	none
Signal Word	none
Hazard Statements	
H412	Harmful to aquatic life with long lasting effects.
Precautionary Statements	
P273	Avoid release to the environment.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Component		Classification	Concentration
Potassium tetracyanozincate			
CAS-No. EC-No. Index-No.	14244-62-3 238-121-8 006-007-00-5	Acute Tox. 2; Acute Tox. 1; Aquatic Acute 1; Aquatic Chronic 1; H300, H330, H310, H400, H410	>= 0.1 - < 1 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

If inhaled
After inhalation: fresh air.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

In case of eye contact
After eye contact: rinse out with plenty of water. Remove contact lenses.

If swallowed
After swallowing: make victim drink water (two glasses at most). Consult doctor if feeling unwell.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

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SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

Carbon oxides
Nitrogen oxides (NOx)
Hydrogen cyanide (hydrocyanic acid)
Nature of decomposition products not known.
Not combustible.
Ambient fire may liberate hazardous vapours.

5.3 Advice for firefighters

In the event of fire, wear self-contained breathing apparatus.

5.4 Further information

Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapors, aerosols. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed.

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Storage class
Storage class (TRGS 510): 12: Non Combustible Liquids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Potassium tetracyanozincate	14244-62-3	TWA	5 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	Remarks	Skin designation		
		C	5 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Danger of cutaneous absorption		
		C	4.7 ppm 5 mg/m3	USA. NIOSH Recommended Exposure Limits
		PEL	5 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		Skin		

8.2 Exposure controls

Appropriate engineering controls
Change contaminated clothing. Wash hands after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

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Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the EC approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Respiratory protection
Not required; except in case of aerosol formation.

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid
b)	Odor	No data available
c)	Odor Threshold	No data available
d)	pH	10 - 11 - (as aqueous solution)
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	No data available
g)	Flash point	()No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Density	No data available
	Relative density	No data available
n)	Water solubility	soluble
o)	Partition coefficient:	No data available

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	n-octanol/water	
p)	Autoignition temperature	Not applicable
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	Not classified as explosive.
t)	Oxidizing properties	none

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
Violent reactions possible with:
The generally known reaction partners of water.

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Mixture

Acute toxicity
Acute toxicity estimate Oral - 2,143 mg/kg
(Calculation method)
Acute toxicity estimate Inhalation - 4 h - 21.43 mg/l - dust/mist(Calculation method)

Acute toxicity estimate Dermal - 2,143 mg/kg
(Calculation method)
No data available

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Skin corrosion/irritation
Remarks: No data available

Serious eye damage/eye irritation
Remarks: No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.
Hazardous properties cannot be excluded but are unlikely when the product is handled appropriately.

Components

Potassium tetracyanozincate

Acute toxicity
Acute toxicity estimate Oral - 5.1 mg/kg
(Expert judgment)
Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)
Acute toxicity estimate Inhalation - 4 h - 0.051 mg/l - dust/mist
(Expert judgment)
Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

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Acute toxicity estimate Dermal - 5.1 mg/kg
(Expert judgment)
Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity
No data available

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

SECTION 12: Ecological information

12.1 Toxicity

Mixture
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties
No data available

12.7 Other adverse effects
No data available

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Components

Potassium tetracyanozincate
No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)
Not dangerous goods

IMDG
Not dangerous goods

IATA
Not dangerous goods

Further information
Not classified as dangerous in the meaning of transport regulations.

SECTION 15: Regulatory information

CERCLA Reportable Quantity

This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

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SARA 313 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Clean Air Act

This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).
This product does not contain any hazardous air pollutants (HAP), as defined by the U.S. Clean Air Act Section 112 (40 CFR 61).
This product does not contain any chemicals listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F).
This product does not contain any chemicals listed under the U.S. Clean Air Act Section 111 SOCMI Intermediate or Final VOC's (40 CFR 60.489).

Clean Water Act

This product does not contain any Hazardous Substances listed under the U.S. CleanWater Act, Section 311, Table 116.4A.
This product does not contain any Hazardous Chemicals listed under the U.S. CleanWater Act, Section 311, Table 117.3.
This product does not contain any toxic pollutants listed under the U.S. Clean Water Act Section 307
This product does not contain any priority pollutants related to the U.S. Clean Water Act

US State Regulations

Massachusetts Right To Know

water	7732-18-5

Pennsylvania Right To Know

Potassium tetracyanozincate	14244-62-3

Maine Chemicals of High Concern

water	7732-18-5

Vermont Chemicals of High Concern

water	7732-18-5

Washington Chemicals of High Concern

water	7732-18-5

California Prop. 65

WARNING: This product can expose you to chemicals including Potassium tetracyanozincate, which is/are known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

The ingredients of this product are reported in the following inventories:

TSCA : All substances listed as active on the TSCA inventory

TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

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SECTION 16: Other information

Relevant changes since previous version

2. Hazards identification
3. Composition/information on ingredients
14. Transport information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 7.1 Revision Date: 09/07/2024 Print Date: 09/08/2024

The life science business of Merck KGaA, Darmstadt, Germany
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SAFETY DATA SHEET

Version 5.8
Revision Date 03/07/2015
Print Date 02/23/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Cyclohexane

Product Number : 320633
Brand : Aldrich
Index-No. : 601-017-00-1

CAS-No. : 110-82-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 2), H225
Skin irritation (Category 2), H315
Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336
Aspiration hazard (Category 1), H304
Acute aquatic toxicity (Category 1), H400

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H225 Highly flammable liquid and vapour.
H304 May be fatal if swallowed and enters airways.
H315 Causes skin irritation.
H336 May cause drowsiness or dizziness.
H400 Very toxic to aquatic life.

Precautionary statement(s)
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P233 Keep container tightly closed.
P240 Ground/bond container and receiving equipment.

P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ eye protection/ face protection.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P312	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P331	Do NOT induce vomiting.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	C_6H_{12}
Molecular weight	:	84.16 g/mol
CAS-No.	:	110-82-7
EC-No.	:	203-806-2
Index-No.	:	601-017-00-1

Hazardous components

Component	Classification	Concentration
Cyclohexane		
	Flam. Liq. 2; Skin Irrit. 2; STOT SE 3; Asp. Tox. 1; Aquatic Acute 1; H225, H304, H315, H336, H400	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Use explosion-proof equipment.Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): Flammable liquids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Cyclohexane	110-82-7	TWA	100.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Central Nervous System impairment		
		TWA	300.000000 ppm 1,050.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	300.000000 ppm 1,050.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 480 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 35 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 4 - 7 °C (39 - 45 °F) - lit.
f)	Initial boiling point and boiling range	80.7 °C (177.3 °F) - lit.
g)	Flash point	-17.99 °C (-0.38 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 9 %(V) Lower explosion limit: 1 %(V)
k)	Vapour pressure	225.0 hPa (168.8 mmHg) at 37.7 °C (99.9 °F) 102.7 hPa (77.0 mmHg) at 20.0 °C (68.0 °F)
l)	Vapour density	No data available
m)	Relative density	0.779 g/cm3 at 25 °C (77 °F)
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	log Pow: 3.44
p)	Auto-ignition temperature	260.0 °C (500.0 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

Vapours may form explosive mixture with air.

10.4 Conditions to avoid

Heat, flames and sparks.

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 12,705 mg/kg

LC50 Inhalation - Rat - 4 h - 34,000 mg/l
(OECD Test Guideline 403)

LD50 Dermal - Rabbit - > 2,000 mg/kg

No data available

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Mild eye irritation

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
May be fatal if swallowed and enters airways.

Additional Information
RTECS: GU6300000

Central nervous system depression, Drowsiness, Irritability, Dizziness, Gastrointestinal disturbance, Lung irritation, chest pain, pulmonary edema

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	flow-through test LC50 - Pimephales promelas (fathead minnow) - 4.53 mg/l -

	96 h (OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	Immobilization EC50 - Daphnia magna (Water flea) - 0.9 mg/l - 48 h (OECD Test Guideline 202)
Toxicity to algae	EC50 - Pseudokirchneriella subcapitata (green algae) - 3.4 mg/l - 72 h (OECD Test Guideline 201)

12.2 Persistence and degradability

Biodegradability Result: - Readily biodegradable

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1145 Class: 3 Packing group: II
Proper shipping name: Cyclohexane
Reportable Quantity (RQ): 1000 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 1145 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: CYCLOHEXANE
Marine pollutant:yes

IATA

UN number: 1145 Class: 3 Packing group: II
Proper shipping name: Cyclohexane

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Cyclohexane	110-82-7	2007-07-01

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Cyclohexane	110-82-7	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Cyclohexane	110-82-7	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Cyclohexane	110-82-7	2007-07-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Asp. Tox.	Aspiration hazard
Flam. Liq.	Flammable liquids
H225	Highly flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H336	May cause drowsiness or dizziness.
H400	Very toxic to aquatic life.
Skin Irrit.	Skin irritation
STOT SE	Specific target organ toxicity - single exposure

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	
Flammability:	3
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	3
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.8 Revision Date: 03/07/2015 Print Date: 02/23/2016

SAFETY DATA SHEET

Classified in accordance with Health Canada Hazardous Products Regulations (SOR/2015-17)

1. Identification

Product identifier: Toluene/Xylene Mixture

Other means of identification

Common name(s), synonym(s): TOLUENE/XYLENE, T/X, C6-C8 Aromatics, TX Mix

SDS number: NOVA-0008

Recommended use and restriction on use

Recommended use: Gasoline blends, industrial feedstock.

Restrictions on use: All uses other than the identified.

Manufacturer/Importer/Supplier/Distributor Information

Manufacturer

Company Name:	NOVA Chemicals
Address:	P.O. Box 2518, Station M Calgary, Alberta, Canada T2P 5C6
Telephone:	Product Information: 1-412-490-4063
SDS Information Email:	msdsemail@novachem.com

Emergency telephone number:

1-800-561-6682, 1-403-314-8767 (NOVA Chemicals) (24 hours)
1-800-424-9300 (CHEMTREC) (24 hours)

2. Hazard(s) identification

Hazard Classification According to Hazardous Products Regulations

Physical Hazards

Flammable liquids	Category 2
Physical Hazards Not Otherwise Classified (PHNOC) - Static-accumulating flammable liquid	Category 1

Health Hazards

Skin Corrosion/Irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Germ Cell Mutagenicity	Category 1B
Carcinogenicity	Category 1A
Reproductive toxicity	Category 2
Specific Target Organ Toxicity - Single Exposure	Category 3
Specific Target Organ Toxicity - Repeated Exposure	Category 1
Specific Target Organ Toxicity - Repeated Exposure	Category 2
Aspiration Hazard	Category 1

Environmental Hazards

Acute hazards to the aquatic environment	Category 2

Chronic hazards to the aquatic environment	Category 2

Label Elements

Hazard Symbol:

Signal Word: Danger

Hazard Statement:

Highly flammable liquid and vapour.
Static accumulating flammable liquid can become electrostatically charged even in bonded and grounded equipment.
Sparks may ignite liquid and vapour.
May cause flash fire or explosion.
Causes skin irritation.
Causes serious eye irritation.
May cause genetic defects.
May cause cancer.
Suspected of damaging fertility or the unborn child.
May cause drowsiness or dizziness.
Causes damage to organs through prolonged or repeated exposure.
(Blood)
May cause damage to organs through prolonged or repeated exposure.
(Central nervous system)
(Hearing organs)
May be fatal if swallowed and enters airways.
Toxic to aquatic life with long lasting effects.

Precautionary Statements:

Prevention:

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Keep container tightly closed. Ground and bond container and receiving equipment. Use explosion-proof electrical, ventilating and lighting equipment. Use non-sparking tools. Take action to prevent static discharges. These alone may be insufficient to remove static electricity. Do not breathe dust/fume/gas/mist/vapours/spray. Wash face, hands and any exposed skin thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Wear protective gloves/ protective clothing/ eye protection/ face protection. Avoid release to the environment.

Response:

IF SWALLOWED: Immediately call a POISON CENTRE/doctor. Do NOT induce vomiting. IF ON SKIN (or hair): Take off immediately all contaminated clothing and wash it before reuse. Rinse skin with water [or shower]. If skin irritation occurs: Get medical advice/attention. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTRE or doctor/ physician if you feel unwell. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention. IF exposed or concerned: Get medical advice/attention. In case of fire: Use dry

chemical, foam, carbon dioxide (CO2), water spray or fog to extinguish. Collect spillage.

Storage: Store in a well-ventilated place. Keep container tightly closed. Store locked up. Keep cool.

Disposal: Dispose of contents/ container to an approved facility in accordance with local, regional, national and international regulations.

Other hazards which do not result in GHS classification: None.

3. Composition/information on ingredients

Mixtures

Chemical Identity	Common name and synonyms	CAS number	Content in percent (%)*
Toluene	Methylbenzene	108-88-3	69 - 85%
Benzene, ethyl-	Ethylbenzene, Phenylethane	100-41-4	9 - 23%
Benzene, dimethyl-	Xylene (mixed isomers)	1330-20-7	5 - 10%
Benzene	Benzol	71-43-2	0 - 1.0%

* All concentrations are percent by weight.

Additional Information: This product is considered hazardous by the Hazardous Products Regulations, 2015.

4. First-aid measures

Inhalation: IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTRE or doctor/ physician if you feel unwell.

Ingestion: IF SWALLOWED: Immediately call a POISON CENTRE/doctor. Do NOT induce vomiting.

Skin Contact: IF ON SKIN (or hair): Take off immediately all contaminated clothing and wash it before reuse. Rinse skin with water [or shower]. If skin irritation occurs: Get medical advice/attention.

Eye contact: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.

Most important symptoms/effects, acute and delayed

Symptoms: Skin irritation. Eye irritation. Drowsiness. Dizziness. Blood disorders. Auditory system disorders including hearing impairment.

Indication of immediate medical attention and special treatment needed

Treatment: Ensure thorough eye and skin decontamination. Treat unconsciousness, nausea, low blood pressure, seizures, and cardiac rhythm disturbances in the conventional manner. Aspiration of this product during induced emesis can result in lung injury. If evacuation of stomach contents is considered necessary, use the method least likely to cause aspiration, such as gastric lavage after protecting the airway. Observe hospitalized patients for delayed chemical pneumonia, acute kidney failure, altered level of consciousness, and cardiac rhythm disturbances. In the event of an unanticipated acute

exposure to toluene, an end-of-shift urine sample for toluene can be used to estimate same-day inhalation and dermal exposures.

5. Fire-fighting measures

General Fire Hazards: Highly flammable liquid and vapour. Vapours are heavier than air and may travel to a source of ignition and flash back. Closed containers may rupture violently when heated. Material will float and can be re-ignited on surface of water. If tank, rail car or tank truck is involved in fire, ISOLATE for 800 metres (1/2 mile) in all directions; also, consider initial evacuation for 800 metres (1/2 mile) in all directions. Vapours may form explosive mixture with air. Keep containers away from source of heat or fire. This product may be a static accumulator which can form an ignitable vapour-air mixture in a storage tank.

Suitable (and unsuitable) extinguishing media

Suitable extinguishing media: Use dry chemical, foam, carbon dioxide (CO2), water spray or fog to extinguish. Use water to cool fire-exposed containers and to protect personnel.

Unsuitable extinguishing media: Do not use straight/direct streams as this may actually spread flames.

Specific hazards arising from the chemical: Upon combustion, this product emits carbon monoxide, carbon dioxide, low molecular weight hydrocarbons.

Special protective equipment and precautions for fire-fighters

Special fire-fighting procedures: Keep upwind. Keep unauthorized personnel away. Move containers from fire area if you can do so without risk. Fight fire from maximum distance or use unmanned holders or monitor nozzles. Immediately withdraw in case of fire and container venting or heat discolouration of a container. Avoid inhaling any smoke and combustion materials. Remove and isolate contaminated clothing and shoes. Cool containers with flooding quantities of water until well after the fire is out. Prevent run-off from fire control or dilution from entering streams, sewers or drinking water supply. Reference Emergency Response Guidebook No. 130 for additional details and instructions.

Special protective equipment for fire-fighters: Wear positive pressure self-contained breathing apparatus (SCBA). Structural fire-fighters' protective clothing provides thermal protection **but only limited chemical protection**.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures: Wear appropriate personal protective equipment. Isolate area. Keep unauthorized personnel away. Alert stand-by emergency and fire-fighting personnel. Monitor surrounding area for buildup of flammable concentrations in air.

Methods and material for containment and cleaning up: Do not touch or walk through spilled material. Eliminate all ignition sources if safe to do so. As an immediate precautionary measure, isolate spill or leak area for at least 50 metres (164 feet) in all directions. Keep upwind. Keep out of low areas. Stop leak if safe to do so. Contain discharge by booming on water or diking on ground. Prevent run-off from fire control or dilution from entering streams, sewers or drinking water supply.

Small Spills: Remove liquid material with non-sparking approved pumps, skimmers or vacuum equipment. Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal. Use non-

sparking tools.

Large Spills: Consider downwind evacuation for 300 metres (1000 feet). Spills on water will volatilize rapidly, making containment or recovery difficult. Dike far ahead of larger spills for later disposal. A vapour-suppressing foam may be used to reduce vapours. Remove pooled liquid material with approved, non-sparking pumps, skimmers or vacuum equipment. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Soil remediation may be required.

7. Handling and storage

Precautions for safe handling:

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Keep container tightly closed. Ground and bond container and receiving equipment. Use explosion-proof electrical, ventilating and lighting equipment. Use non-sparking tools. Take action to prevent static discharges. These alone may be insufficient to remove static electricity. For additional information on equipment bonding and grounding, refer to the American Petroleum Institute (API) Recommended Practice 2003, "Protection Against Ignitions Arising out of Static, Lightning, and Stray Currents" or National Fire Protection Association (NFPA) 77, "Recommended Practice on Static Electricity". For additional information on storing and handling flammable liquids, refer to the National Fire Protection Association (NFPA) 30, "Flammable and Combustible Liquids Code". Take special precautions when cold cutting or breaking into lines, or when cleaning and disposing of empty containers. Parts and equipment should be steam cleaned prior to maintenance procedures. Do not breathe dust/fume/gas/mist/vapours/spray. Avoid contact with skin and eyes. Keep away from incompatible materials such as oxidizing agents and acids. Wash face, hands and any exposed skin thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Wear protective gloves/ protective clothing/ eye protection/ face protection. In case of inadequate ventilation, use respiratory protection. Avoid release to the environment.

Conditions for safe storage, including any incompatibilities:

Storage area should be clearly identified, well-illuminated and clear of obstruction. Store in a well-ventilated place. Keep container tightly closed. Store locked up. Keep cool. Only allow access to authorized persons. Store and handle in properly designed pressure vessels and equipment. Store and use away from heat, sparks, open flame, or any other ignition source. Use non-sparking ventilation systems, approved explosion-proof equipment, and intrinsically safe electrical systems. Have appropriate extinguishing capability in storage area (e.g. sprinkler system, portable fire extinguishers) and flammable gas detectors. Keep absorbents for leaks and spills readily available. Consider use of external floating roof tanks or flame arrestors. Inspect vents during winter conditions for vapour ice buildup. Storage tanks should be above ground and diked to hold entire contents. Store away from incompatible materials. Store according to applicable regulations and standards for flammable materials.

8. Exposure controls/personal protection

Control Parameters

Occupational Exposure Limits

Chemical Identity	type	Exposure Limit Values		Source
Toluene	TWA	50 ppm	188 mg/m3	Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2), as amended

Toluene	TWA	20 ppm		Canada. British Columbia OELs: Table of Exposure Limits for Chemical Biological Substances (Workers Compensation Board); as amended
Toluene	TWA	20 ppm		Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents), as amended
Toluene	TWA	50 ppm	188 mg/m3	Canada. Quebec OELs. (Ministry of Labor - Regulation respecting occupational health and safety), as amended
Toluene	TWA	20 ppm		US. ACGIH Threshold Limit Values, as amended
Toluene	STEL	150 ppm	560 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards, as amended
Toluene	REL	100 ppm	375 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards, as amended
Toluene	IDLH	500 ppm		US. NIOSH. Immediately Dangerous to Life or Health (IDLH) Values, as amended
Benzene, ethyl-	STEL	125 ppm	543 mg/m3	Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2), as amended
	TWA	100 ppm	434 mg/m3	Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2), as amended
Benzene, ethyl-	TWA	20 ppm		Canada. British Columbia OELs: Table of Exposure Limits for Chemical Biological Substances (Workers Compensation Board); as amended
Benzene, ethyl-	TWA	20 ppm		Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents), as amended
Benzene, ethyl-	TWA	20 ppm		Canada. Quebec OELs. (Ministry of Labor - Regulation respecting occupational health and safety), as amended
Benzene, ethyl-	TWA	20 ppm		US. ACGIH Threshold Limit Values, as amended
Benzene, ethyl-	REL	100 ppm	435 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards, as amended
Benzene, ethyl-	STEL	125 ppm	545 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards, as amended
Benzene, ethyl-	IDLH	800 ppm		US. NIOSH. Immediately Dangerous to Life or Health (IDLH) Values, as amended
Benzene, dimethyl-	STEL	150 ppm	651 mg/m3	Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2), as amended
	TWA	100 ppm	434 mg/m3	Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2), as amended
Benzene, dimethyl-	TWA	100 ppm		Canada. British Columbia OELs: Table of Exposure Limits for Chemical Biological Substances (Workers Compensation Board); as amended
	STEL	150 ppm		Canada. British Columbia OELs: Table of Exposure Limits for Chemical Biological Substances (Workers Compensation Board); as amended
Benzene, dimethyl-	TWA	100 ppm		Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents), as amended
	STEL	150 ppm		Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents), as amended
Benzene, dimethyl-	STEL	150 ppm	651 mg/m3	Canada. Quebec OELs. (Ministry of Labor - Regulation respecting occupational health and safety), as amended
	TWA	100 ppm	434 mg/m3	Canada. Quebec OELs. (Ministry of Labor - Regulation respecting occupational health and safety), as amended
Benzene, dimethyl-	STEL	150 ppm	655 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards, as amended
Benzene, dimethyl-	REL	100 ppm	435 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards, as amended
Benzene, dimethyl-	TWA	20 ppm		US. ACGIH Threshold Limit Values, as amended

Benzene	STEL	2.5 ppm	8 mg/m3	Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2), as amended
	TWA	0.5 ppm	1.6 mg/m3	Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2), as amended
Benzene	STEL	2.5 ppm		Canada. British Columbia OELs: Table of Exposure Limits for Chemical Biological Substances (Workers Compensation Board); as amended
	TWA	0.5 ppm		Canada. British Columbia OELs: Table of Exposure Limits for Chemical Biological Substances (Workers Compensation Board); as amended
Benzene	STEL	2.5 ppm		Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents), as amended
	TWA	0.5 ppm		Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents), as amended
Benzene	TWA	1 ppm	3 mg/m3	Canada. Quebec OELs. (Ministry of Labor - Regulation respecting occupational health and safety), as amended
	STEL	5 ppm	15.5 mg/m3	Canada. Quebec OELs. (Ministry of Labor - Regulation respecting occupational health and safety), as amended
Benzene	REL	0.1 ppm		US. NIOSH: Pocket Guide to Chemical Hazards, as amended
Benzene	STEL	1 ppm		US. NIOSH: Pocket Guide to Chemical Hazards, as amended
Benzene	IDLH	500 ppm		US. NIOSH. Immediately Dangerous to Life or Health (IDLH) Values, as amended
Benzene	TWA	0.02 ppm		US. ACGIH Threshold Limit Values, as amended

Biological Limit Values

Chemical Identity	Exposure Limit Values	Source
Toluene (toluene: Sampling time: Prior to last shift of work week.)	0.02 mg/l (Blood)	ACGIH BEI
Toluene (o-Cresol, with hydrolysis: Sampling time: End of shift.)	0.3 mg/g (Creatinine in urine)	ACGIH BEI
Toluene (toluene: Sampling time: End of shift.)	0.03 mg/l (Urine)	ACGIH BEI
Benzene, ethyl- (Sum of mandelic acid and phenylglyoxylic acid: Sampling time: End of shift.)	150 mg/g (Creatinine in urine)	ACGIH BEI
Benzene, dimethyl- (Methylhippuric acids: Sampling time: End of shift.)	0.3 g/g (Creatinine in urine)	ACGIH BEI
Benzene (S-Phenylmercapturic acid: Sampling time: End of shift.)	25 µg/g (Creatinine in urine)	ACGIH BEI
Benzene (t,t-Muconic acid: Sampling time: End of shift.)	500 µg/g (Creatinine in urine)	ACGIH BEI

Exposure guidelines

Chemical Identity	Notations	Source
Toluene	Can be absorbed through the skin.	Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2), as amended
	Can be absorbed through the skin.	Canada. Quebec OELs. (Ministry of Labor - Regulation respecting occupational health and safety), as amended
Benzene	Can be absorbed through the skin.	Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2), as amended

	Can be absorbed through the skin.	Canada. British Columbia OELs: Table of Exposure Limits for Chemical Biological Substances (Workers Compensation Board); as amended
	Can be absorbed through the skin.	Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents), as amended

Appropriate Engineering Controls

Engineering methods to reduce hazardous exposure are preferred controls. Methods include mechanical ventilation (dilution and local exhaust) process or personal enclosure, remote and automated operation, control of process conditions, leak detection and repair systems, and other process modifications. Ensure all exhaust ventilation systems are discharged to outdoors, away from air intakes and ignition sources. Supply sufficient replacement air to make up for air removed by exhaust systems. Administrative (procedure) controls and use of personal protective equipment may also be required.

Individual protection measures, such as personal protective equipment

General information:

Personal protective equipment (PPE) should not be considered a long-term solution to exposure control. Employer programs to properly select, fit, maintain and train employees to use equipment must accompany PPE. Consult a competent industrial hygiene resource, the PPE manufacturer's recommendation, and/or applicable regulations to determine hazard potential and ensure adequate protection.

Eye/face protection:

Safety glasses. Chemical goggles are recommended if splashing is possible or to prevent eye irritation from vapours.

Skin Protection

Hand Protection:

Chemical resistant gloves.

Skin and Body Protection:

Wear appropriate clothing to prevent any possibility of skin contact. Wear work clothes with long sleeves and pants. If splashing or contact with liquid material is possible, consider the need for an impervious overcoat. Fire resistant (i.e., Nomex) or natural fibre clothing (i.e., cotton or wool) is recommended. Synthetic clothing can generate static electricity and is not recommended where a flammable vapour release may occur. Wear chemical-resistant safety footwear with good traction to prevent slipping. Static Dissipative (SD) rated footwear is also recommended.

Respiratory Protection:

Appropriate NIOSH approved air-purifying respirator that meets the requirements of CSA Standard CAN/CSA-Z94.4, or self-contained breathing apparatus should be used. Supplied air breathing apparatus must be used when oxygen concentrations are low or if airborne concentrations exceed the limits of the air-purifying respirators or IDLH levels.

Hygiene measures:

Use effective control measures and PPE to maintain worker exposure to concentrations that are below these limits. Ensure that eyewash stations and safety showers are in close proximity to work locations.

9. Physical and chemical properties

Appearance

Physical state:	liquid
Form:	liquid
Colour:	Colourless
Odour:	Aromatic
Odour Threshold:	2 - 5 ppm
pH:	not applicable

Melting point/freezing point:	-80 °C (-112 °F)
Initial boiling point and boiling range:	110 - 140 °C (230 - 284 °F)
Flash Point:	4 °C (39 °F)
Evaporation rate:	Medium at 20 °C (68 °F) (n-butyl acetate=1)
Flammability (solid, gas):	not applicable
Upper/lower limit on flammability or explosive limits	
Flammability limit - upper (%):	7 %(V) (toluene)
Flammability limit - lower(%):	1 %(V) (toluene)
Vapour pressure:	4.8 kPa (37.8 °C (100.0 °F))
Vapour density:	3.18 (Air=1) (toluene) (calculated)
Density:	871.0 - 871.5 kg/m3
Relative density:	0.871 - 0.8715 (15 °C (59 °F)) (Water=1)
Solubility(ies)	
Solubility in water:	Insoluble in water
Solubility (other):	No data available.
Partition coefficient (n-octanol/water):	3.12 - 3.20
Auto-ignition temperature:	450 - 500 °C (842 - 932 °F)
Decomposition temperature:	No data available.
Viscosity:	2 mm2/s (40 °C (104 °F)), estimated

10. Stability and reactivity

Reactivity:	Contact with incompatible materials. Sources of ignition. Exposure to heat.
Chemical Stability:	Material is stable under normal conditions.
Possibility of Hazardous Reactions:	No data available.
Conditions to Avoid:	Exposure to open flame or excessive heat can cause fire or explosion. Keep away from heat, sparks and open flame.
Incompatible Materials:	Oxidizing agents, acids.
Hazardous Decomposition Products:	Upon decomposition, this product emits carbon monoxide, carbon dioxide, low molecular weight hydrocarbons.

11. Toxicological information

Information on likely routes of exposure

Inhalation:	Inhalation of this product may result in central nervous system effects including headache. Excessive inhalation of this material may also cause damage to blood systems and possibly cancer (leukemia). Minute amounts aspirated into the lungs during ingestion or vomiting may cause severe pulmonary injury. May cause hearing impairment.
Ingestion:	Minute amounts aspirated into the lungs during ingestion or vomiting may cause severe pulmonary injury. Ingestion of this product may result in vomiting, nausea, abdominal pain and central nervous system effects including headache, sleepiness, dizziness, nausea, loss of coordination. Ingestion may also cause blood disorders and cancer. May cause hearing impairment.
Skin Contact:	Causes skin irritation.

Eye contact: Causes serious eye irritation.

Symptoms related to the physical, chemical and toxicological characteristics

Inhalation: Central nervous system effects including headache.

Ingestion: Vomiting, nausea, abdominal pain and central nervous system effects including headache.

Skin Contact: Skin irritation.

Eye contact: Serious eye irritation.

Information on toxicological effects

Acute toxicity (list all possible routes of exposure)

Oral
Product: Not classified for acute toxicity based on available data.

Dermal
Product: Not classified for acute toxicity based on available data.

Inhalation
Product: Not classified for acute toxicity based on available data.

Repeated dose toxicity
Product: No data available.

Components:
Benzene — LOAEL (Rat, Oral): 25 mg/kg (Target Organ(s): Blood)
LOAEL (Rat, Inhalation - vapour): 0.958 mg/l (Target Organ(s): Blood)
LOAEL (Human, Inhalation - vapour): 0.0018 mg/l (Target Organ(s): Blood)

Skin Corrosion/Irritation
Product: Causes skin irritation.

Serious Eye Damage/Eye Irritation
Product: Causes serious eye irritation.

Respiratory or Skin Sensitization
Product: No data available.

Carcinogenicity
Product: May cause cancer.

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:
Benzene, ethyl- — Overall evaluation: 2B. Possibly carcinogenic to humans.
Benzene — Overall evaluation: 1. Carcinogenic to humans.

US. National Toxicology Program (NTP) Report on Carcinogens:
Benzene — Known To Be Human Carcinogen.

ACGIH Carcinogen List:
Benzene, ethyl- — Group A3: Confirmed animal carcinogen with unknown relevance to humans.
Benzene — Group A1: Confirmed human carcinogen.

Germ Cell Mutagenicity

In vitro
Product: May cause genetic defects.

In vivo
Product: May cause genetic defects.

Reproductive toxicity
Product: Suspected of damaging fertility or the unborn child.

Specific Target Organ Toxicity - Single Exposure
Product: May cause drowsiness or dizziness.

Specific Target Organ Toxicity - Repeated Exposure
Product: Blood - Causes damage to organs through prolonged or repeated exposure.

Central nervous system, hearing organs - May cause damage to organs through prolonged or repeated exposure.

Aspiration Hazard
Product: May be fatal if swallowed and enters airways.

Other effects: Xylene is a developmental toxicant in Canada.

12. Ecological information

Ecotoxicity:

Acute hazards to the aquatic environment:

Fish
Product: Toxic to aquatic life.

Aquatic Invertebrates
Product: Toxic to aquatic life.

Toxicity to aquatic plants
Product: Toxic to aquatic life.

Chronic hazards to the aquatic environment:

Fish
Product: Toxic to aquatic life with long lasting effects.

Aquatic Invertebrates
Product: Toxic to aquatic life with long lasting effects.

Toxicity to aquatic plants
Product: Toxic to aquatic life with long lasting effects.

Persistence and Degradability

Biodegradation
Product: No data available.

BOD/COD Ratio
Product: No data available.

Bioaccumulative Potential
Bioconcentration Factor (BCF)
Product: No data available.

Components:
Toluene — Leuciscus idus melanotus, Bioconcentration Factor (BCF): 90 Aquatic sediment Experimental result, Key study

Benzene	Clupea harengus, Bioconcentration Factor (BCF): 11 Aquatic sediment Experimental result, Supporting study

Partition Coefficient n-octanol / water (log Kow)

Product: 3.12 - 3.20

Mobility in Soil: Product is likely to have low to moderate absorption into soil and sediment based on Log Kow.

Other Adverse Effects: No data available.

13. Disposal considerations

Disposal instructions: Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal. Waste generator is advised to carefully consider hazardous properties and control measures needed for other materials that may be found in the waste.

Contaminated Packaging: Check local, federal and provincial environmental regulations prior to disposal.

14. Transport information

TDG

UN number or ID number:	UN 1993
UN Proper Shipping Name:	FLAMMABLE LIQUID, N.O.S. (Toluene, Ethylbenzene, Xylene (mixed isomers))
Class	3
Packing Group	II
Label(s)	3
Subsidiary risk label	–
Special precautions for user:	Reference Emergency Response Guidebook No. 130, latest revision. (which is applicable due to noxious components in the product)

IMDG

UN number or ID number:	UN 1993
UN Proper Shipping Name:	FLAMMABLE LIQUID, N.O.S. (Toluene, Ethylbenzene, Xylene (mixed isomers))
Transport Hazard Class(es)	
Class:	3
Label(s):	3
EmS No.:	F-E, S-E
Packing Group:	II
Marine pollutant:	No
Limited quantity	1.00L
Excepted quantity	E2
Special precautions for user:	Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code: Annex II - yes; IBC02

15. Regulatory information

Canada Federal Regulations

List of Toxic Substances (CEPA, Schedule 1)

Chemical Identity
Benzene

Export Control List (CEPA 1999, Schedule 3)
Not regulated

National Pollutant Release Inventory (NPRI)

Canada. Canadian Environmental Protection Act (CEPA). National Pollutant Release Inventory (NPRI) (Parts 1-4)

NPRI	Toluene Benzene, ethyl- Benzene, dimethyl- Benzene

Canada. National Pollutant Release Inventory (NPRI) Substances, Part 5, VOCs with Additional Reporting Requirements

NPRI PT5	Toluene Benzene, dimethyl- Benzene

Greenhouse Gases
Not regulated

Precursor Control Regulations

Chemical Identity
Toluene

Canada. Substances Subject to Significant New Activity (SNAc) Reporting Requirements
Not regulated

Inventory status

Canada DSL Inventory List:	On or in compliance with the inventory
US TSCA Inventory:	On or in compliance with the inventory

16. Other information, including date of preparation or last revision

Issue Date: 07/29/2024

Revision Information:
07/29/2024: SDS Update – OEL updates and phrase edits
11/02/2023: SDS Update – GHS classification change, OEL edits, phrase edits
12/06/2019: SDS Update

Version #: 8.2

Abbreviations and acronyms:
ACGIH = American Conference of Governmental Industrial Hygienists; BOD = Biochemical Oxygen Demand; CAS = Chemical Abstracts Service; CEPA = Canadian Environmental Protection Act; COD = Chemical Oxygen Demand; DSL = Domestic Substances List; EC50 = Effective Concentration 50%; EPA = Environmental Protection Agency; GHS = Globally Harmonized System for the Classification and Labelling of Chemicals; IARC = International Agency for Research on Cancer; IDLH = Immediately Dangerous to Life or Health; Kow = Octanol/water partition coefficient; LC50 = Lethal Concentration 50%; LD50 = Lethal Dose 50%; LEL = Lower Explosive Limit; NDSL = Non-Domestic Substances List; NFPA = National Fire Protection Association; NIOSH = National Institute for Occupational Safety and Health; NTP = National Toxicology Program; OEL = Occupational Exposure Limit; OSHA = Occupational Safety and Health Administration; PNOC = Particulates Not Otherwise Classified; PPE = Personal Protective Equipment; REL = Recommended Exposure Limit; SCBA = Self Contained Breathing Apparatus; SDS = Safety Data Sheet; STEL = Short Term Exposure Limit; TDG = Transportation of Dangerous Goods; TLV = Threshold Limit Value; TSCA = Toxic Substances Control Act; TWA = Time Weighted Average

Further Information: For additional information on equipment bonding and grounding, refer to the American Petroleum Institute (API) Recommended Practice 2003, "Protection Against Ignitions Arising out of Static, Lightning, and Stray Currents" or

National Fire Protection Association (NFPA) 77, "Recommended Practice on Static Electricity".

For additional information on storing and handling flammable liquids, refer to the National Fire Protection Association (NFPA) 30, "Flammable and Combustible Liquids Code".

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SAFETY DATA SHEET

Version 6.6
Revision Date 09/06/2024
Print Date 09/07/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : 4,4'-DDE

Product Number : 35487
Brand : Sigma-Aldrich
CAS-No. : 72-55-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 3), H301
Carcinogenicity (Category 2), H351
Specific target organ toxicity - repeated exposure, Oral (Category 1), H372
Short-term (acute) aquatic hazard (Category 1), H400
Long-term (chronic) aquatic hazard (Category 1), H410

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For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal Word Danger

Hazard Statements

H301	Toxic if swallowed.
H351	Suspected of causing cancer.
H372	Causes damage to organs through prolonged or repeated exposure if swallowed.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary Statements

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust/ fume/ gas/ mist/ vapors/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER/ doctor. Rinse mouth.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms : 1,1-Dichloro-2,2-bis(4-chlorophenyl)ethene

Formula : $C_{14}H_8Cl_4$
Molecular weight : 318.03 g/mol
CAS-No. : 72-55-9
EC-No. : 200-784-6

Component	Classification	Concentration
2,2-bis(p-Chlorophenyl)-1,1-dichloroethylene		
	Acute Tox. 3; Carc. 2; STOT RE 1; Aquatic Acute 1; Aquatic Chronic 1; H301, H351, H372, H400,	<= 100 %

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	H410 M-Factor - Aquatic Acute: 100	

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Call in physician.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

In case of eye contact
After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

If swallowed
If swallowed: give water to drink (two glasses at most). Seek medical advice immediately. In exceptional cases only, if medical care is not available within one hour, induce vomiting (only in persons who are wide awake and fully conscious), administer activated charcoal (20 - 40 g in a 10% slurry) and consult a doctor as quickly as possible.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Water Foam Carbon dioxide (CO2) Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Carbon oxides
Hydrogen chloride gas
Combustible.
Development of hazardous combustion gases or vapours possible in the event of fire.

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5.3 Advice for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information
Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Avoid generation and inhalation of dusts in all circumstances. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully. Dispose of properly. Clean up affected area. Avoid generation of dusts.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Work under hood. Do not inhale substance/mixture.

Hygiene measures
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Dry. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.

Storage class
Storage class (TRGS 510): 6.1C: Combustible, acute toxic Cat.3 / toxic compounds or compounds which causing chronic effects

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

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SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
Handle with impervious gloves.

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

Body Protection
protective clothing

Respiratory protection
Recommended Filter type: Filter type P3
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when dusts are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains.

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SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odor	No data available
c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/ range: 88.0 - 90.0 °C (190.4 - 194.0 °F)
f)	Initial boiling point and boiling range	No data available
g)	Flash point	()No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	< 0.000 hPa
l)	Vapor density	No data available
m)	Density	No data available
	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	log Pow: 6.51
p)	Autoignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

No data available

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SECTION 10: Stability and reactivity

10.1 Reactivity
The following applies in general to flammable organic substances and mixtures: in correspondingly fine distribution, when whirled up a dust explosion potential may generally be assumed.

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
Strong oxidizing agents, Strong bases

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 87.0 mg/kg
Remarks: The value is given in analogy to the following substances: 1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane
Inhalation: No data available
Dermal: No data available
No data available

Skin corrosion/irritation
Remarks: No data available

Serious eye damage/eye irritation
Remarks: No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity
This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.
Limited evidence of carcinogenicity in animal studies

IARC: 2A - Group 2A: Probably carcinogenic to humans (2,2-bis(p-Chlorophenyl)-1,1-dichloroethylene)

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

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OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
Remarks: No data available
The value is given in analogy to the following substances: 1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane
Ingestion - Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard
No data available

11.2 Additional Information

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - 0.01 mg/l - 96 h Remarks: The value is given in analogy to the following substances: 1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane LC50 - Lepomis macrochirus (Bluegill sunfish) - 0.01 mg/l - 96 h Remarks: The value is given in analogy to the following substances: 1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane LC50 - Oncorhynchus mykiss (rainbow trout) - 0.003400 mg/l - 96 h Remarks: The value is given in analogy to the following substances: 1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane
Toxicity to daphnia and other aquatic invertebrates	Immobilization EC50 - Daphnia magna (Water flea) - 0.00108 mg/l - 48 h Remarks: The value is given in analogy to the following substances: 1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane
Toxicity to fish(Chronic toxicity)	NOEC - Oncorhynchus mykiss (rainbow trout) - 113 mg/l - 3.0 d Remarks: The value is given in analogy to the following substances: 1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane

12.2 Persistence and degradability
No data available

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12.3 Bioaccumulative potential

Bioaccumulation Gambusia affinis (Mosquito fish) - 33 d
- 3.84 µg/l(2,2-bis(p-Chlorophenyl)-1,1-dichloroethylene)

Bioconcentration factor (BCF): 12,037

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties

No data available

12.7 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)

UN number: 2811 Class: 6.1 Packing group: III
Proper shipping name: Toxic solids, organic, n.o.s. (2,2-bis(p-Chlorophenyl)-1,1-dichloroethylene)
Reportable Quantity (RQ): 1 lbs
Marine pollutant: yes Poison Inhalation Hazard: No

IMDG

UN number: 2811 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. (2,2-bis(p-Chlorophenyl)-1,1-dichloroethylene)
Marine pollutant : yes

IATA

UN number: 2811 Class: 6.1 Packing group: III
Proper shipping name: Toxic solid, organic, n.o.s. (2,2-bis(p-Chlorophenyl)-1,1-dichloroethylene)

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SECTION 15: Regulatory information

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
2,2-bis(p-Chlorophenyl)-1,1-dichloroethylene	72-55-9	1	1

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

Components	CAS-No.	Component TPQ (lbs)

SARA 311/312 Hazards : Acute Health Hazard
Chronic Health Hazard

SARA 313 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

US State Regulations

Massachusetts Right To Know

No components are subject to the Massachusetts Right to Know Act.

Massachusetts Right To Know

No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know

2,2-bis(p-Chlorophenyl)-1,1-dichloroethylene 72-55-9

Pennsylvania Right To Know

2,2-bis(p-Chlorophenyl)-1,1-dichloroethylene 72-55-9

Maine Chemicals of High Concern

Product does not contain any listed chemicals

Vermont Chemicals of High Concern

Product does not contain any listed chemicals

Washington Chemicals of High Concern

Product does not contain any listed chemicals

New Jersey Right To Know

2,2-bis(p-Chlorophenyl)-1,1-dichloroethylene 72-55-9

The ingredients of this product are reported in the following inventories:

TSCA : Product contains substance(s) not listed on TSCA inventory.

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TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.6 Revision Date: 09/06/2024 Print Date: 09/07/2024

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SAFETY DATA SHEET

Version 7.1
Revision Date 09/07/2024
Print Date 09/08/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Cyanide Standard for IC

Product Number : 90157
Brand : Sigma-Aldrich

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Short-term (acute) aquatic hazard (Category 3), H402
Long-term (chronic) aquatic hazard (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

The life science business of Merck KGaA, Darmstadt, Germany
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Pictogram	none
Signal Word	none
Hazard Statements	
H412	Harmful to aquatic life with long lasting effects.
Precautionary Statements	
P273	Avoid release to the environment.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Component		Classification	Concentration
Potassium tetracyanozincate			
CAS-No. EC-No. Index-No.	14244-62-3 238-121-8 006-007-00-5	Acute Tox. 2; Acute Tox. 1; Aquatic Acute 1; Aquatic Chronic 1; H300, H330, H310, H400, H410	>= 0.1 - < 1 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

If inhaled
After inhalation: fresh air.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

In case of eye contact
After eye contact: rinse out with plenty of water. Remove contact lenses.

If swallowed
After swallowing: make victim drink water (two glasses at most). Consult doctor if feeling unwell.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

Carbon oxides
Nitrogen oxides (NOx)
Hydrogen cyanide (hydrocyanic acid)
Nature of decomposition products not known.
Not combustible.
Ambient fire may liberate hazardous vapours.

5.3 Advice for firefighters

In the event of fire, wear self-contained breathing apparatus.

5.4 Further information

Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapors, aerosols. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed.

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Storage class
Storage class (TRGS 510): 12: Non Combustible Liquids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Potassium tetracyanozincate	14244-62-3	TWA	5 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	Remarks	Skin designation		
		C	5 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Danger of cutaneous absorption		
		C	4.7 ppm 5 mg/m3	USA. NIOSH Recommended Exposure Limits
		PEL	5 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		Skin		

8.2 Exposure controls

Appropriate engineering controls
Change contaminated clothing. Wash hands after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

The life science business of Merck KGaA, Darmstadt, Germany
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Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the EC approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Respiratory protection
Not required; except in case of aerosol formation.

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid
b)	Odor	No data available
c)	Odor Threshold	No data available
d)	pH	10 - 11 - (as aqueous solution)
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	No data available
g)	Flash point	()No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Density	No data available
	Relative density	No data available
n)	Water solubility	soluble
o)	Partition coefficient:	No data available

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	n-octanol/water	
p)	Autoignition temperature	Not applicable
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	Not classified as explosive.
t)	Oxidizing properties	none

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
Violent reactions possible with:
The generally known reaction partners of water.

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Mixture

Acute toxicity
Acute toxicity estimate Oral - 2,143 mg/kg
(Calculation method)
Acute toxicity estimate Inhalation - 4 h - 21.43 mg/l - dust/mist(Calculation method)

Acute toxicity estimate Dermal - 2,143 mg/kg
(Calculation method)
No data available

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Skin corrosion/irritation
Remarks: No data available

Serious eye damage/eye irritation
Remarks: No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.
Hazardous properties cannot be excluded but are unlikely when the product is handled appropriately.

Components

Potassium tetracyanozincate

Acute toxicity
Acute toxicity estimate Oral - 5.1 mg/kg
(Expert judgment)
Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)
Acute toxicity estimate Inhalation - 4 h - 0.051 mg/l - dust/mist
(Expert judgment)
Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

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Acute toxicity estimate Dermal - 5.1 mg/kg
(Expert judgment)
Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity
No data available

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

SECTION 12: Ecological information

12.1 Toxicity

Mixture
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties
No data available

12.7 Other adverse effects
No data available

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Components

Potassium tetracyanozincate
No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)
Not dangerous goods

IMDG
Not dangerous goods

IATA
Not dangerous goods

Further information
Not classified as dangerous in the meaning of transport regulations.

SECTION 15: Regulatory information

CERCLA Reportable Quantity

This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

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SARA 313 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Clean Air Act

This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).
This product does not contain any hazardous air pollutants (HAP), as defined by the U.S. Clean Air Act Section 112 (40 CFR 61).
This product does not contain any chemicals listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F).
This product does not contain any chemicals listed under the U.S. Clean Air Act Section 111 SOCMI Intermediate or Final VOC's (40 CFR 60.489).

Clean Water Act

This product does not contain any Hazardous Substances listed under the U.S. CleanWater Act, Section 311, Table 116.4A.
This product does not contain any Hazardous Chemicals listed under the U.S. CleanWater Act, Section 311, Table 117.3.
This product does not contain any toxic pollutants listed under the U.S. Clean Water Act Section 307
This product does not contain any priority pollutants related to the U.S. Clean Water Act

US State Regulations

Massachusetts Right To Know

water	7732-18-5

Pennsylvania Right To Know

Potassium tetracyanozincate	14244-62-3

Maine Chemicals of High Concern

water	7732-18-5

Vermont Chemicals of High Concern

water	7732-18-5

Washington Chemicals of High Concern

water	7732-18-5

California Prop. 65

WARNING: This product can expose you to chemicals including Potassium tetracyanozincate, which is/are known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

The ingredients of this product are reported in the following inventories:

TSCA : All substances listed as active on the TSCA inventory

TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

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SECTION 16: Other information

Relevant changes since previous version

2. Hazards identification
3. Composition/information on ingredients
14. Transport information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 7.1 Revision Date: 09/07/2024 Print Date: 09/08/2024

The life science business of Merck KGaA, Darmstadt, Germany
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SAFETY DATA SHEET

Version 3.7
Revision Date 11/25/2014
Print Date 01/29/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Dibenzofuran

Product Number : 236373
Brand : Aldrich

CAS-No. : 132-64-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 4), H302
Acute aquatic toxicity (Category 2), H401
Chronic aquatic toxicity (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)
H302 Harmful if swallowed.
H411 Toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P273 Avoid release to the environment.
P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell. Rinse mouth.
P391 Collect spillage.
P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : Diphenylene oxide

Formula : $C_{12}H_8O$
Molecular weight : 168.19 g/mol
CAS-No. : 132-64-9
EC-No. : 205-071-3

Hazardous components

Component	Classification	Concentration
Dibenzofuran		
	Acute Tox. 4; Aquatic Acute 2; Aquatic Chronic 2; H302, H411	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.
Storage class (TRGS 510): Non Combustible Solids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an

industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator.For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: crystalline Colour: white, beige
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 80 - 82 °C (176 - 180 °F) - lit.
f)	Initial boiling point and boiling range	154 - 155 °C (309 - 311 °F) at 27 hPa (20 mmHg) - lit.
g)	Flash point	130.0 °C (266.0 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	log Pow: 3.77
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
The preceding data, or interpretation of data, was determined using Quantitative Structure Activity Relationship (QSAR) modeling.

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: HP4430000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	NOEC - Cyprinodon variegatus (sheepshead minnow) - 1 mg/l - 96.0 h
	LC50 - Pimephales promelas (fathead minnow) - 1.05 mg/l - 96.0 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Dibenzofuran)
Reportable Quantity (RQ): 100 lbs
Marine pollutant:yes
Poison Inhalation Hazard: No

IMDG
UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Dibenzofuran)
Marine pollutant:yes

IATA
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Dibenzofuran)

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date

Dibenzofuran	132-64-9	2007-07-01

SARA 311/312 Hazards
Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Dibenzofuran	132-64-9	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Dibenzofuran	132-64-9	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Dibenzofuran	132-64-9	2007-07-01

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
H302	Harmful if swallowed.
H401	Toxic to aquatic life.
H411	Toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	1
Chronic Health Hazard:	
Flammability:	1
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	1
Reactivity Hazard:	0

Further information
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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information
Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 3.7 Revision Date: 11/25/2014 Print Date: 01/29/2016

SAFETY DATA SHEET

Halocarbon R-12 (Dichlorodifluoromethane)

Section 1. Identification

GHS product identifier : Halocarbon R-12 (Dichlorodifluoromethane)

Chemical name : dichlorodifluoromethane

Other means of identification : ASPEN R-12, Methane, dichlorodifluoro-; Refrigerant 12; Propellant 12; Halon 122; Genetron 12; Freon 12; Fluorocarbon 12; Difluorodichloromethane; DICHLORODIFLUOROMETHANE (FC 12); CFC-12

Product use : Synthetic/Analytical chemistry.

Synonym : ASPEN R-12, Methane, dichlorodifluoro-; Refrigerant 12; Propellant 12; Halon 122; Genetron 12; Freon 12; Fluorocarbon 12; Difluorodichloromethane; DICHLORODIFLUOROMETHANE (FC 12); CFC-12

SDS # : 001018

Supplier's details : Airgas USA, LLC and its affiliates
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253

Emergency telephone number (with hours of operation) : 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : GASES UNDER PRESSURE - Liquefied gas
HAZARDOUS TO THE OZONE LAYER - Category 1

GHS label elements

Hazard pictograms :

Signal word : Warning

Hazard statements : Contains gas under pressure; may explode if heated.
May cause frostbite.
May displace oxygen and cause rapid suffocation.
Harms public health and the environment by destroying ozone in the upper atmosphere.

Precautionary statements

General : Read and follow all Safety Data Sheets (SDS'S) before use. Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Use a back flow preventative device in the piping. Use only equipment of compatible materials of construction. Always keep container in upright position.

Prevention : Use and store only outdoors or in a well ventilated place.

Response : Not applicable.

Storage : Protect from sunlight. Protect from sunlight when ambient temperature exceeds 52°C/125°F. Store in a well-ventilated place.

Disposal : Refer to manufacturer/supplier for information on recovery/recycling.

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Section 2. Hazards identification

Hazards not otherwise classified : Liquid can cause burns similar to frostbite.

Section 3. Composition/information on ingredients

Substance/mixture : Substance

Chemical name : dichlorodifluoromethane

Other means of identification : ASPEN R-12, Methane, dichlorodifluoro-; Refrigerant 12; Propellant 12; Halon 122; Genetron 12; Freon 12; Fluorocarbon 12; Difluorodichloromethane; DICHLORODIFLUOROMETHANE (FC 12); CFC-12

CAS number/other identifiers

CAS number : 75-71-8

Product code : 001018

Ingredient name	%	CAS number
Methane, dichlorodifluoro-	100	75-71-8

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. In case of contact with liquid, warm frozen tissues slowly with lukewarm water and get medical attention. Do not rub affected area. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if adverse health effects persist or are severe. Ingestion of liquid can cause burns similar to frostbite. If frostbite occurs, get medical attention. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. As this product rapidly becomes a gas when released, refer to the inhalation section.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Liquid can cause burns similar to frostbite.

Inhalation : Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.

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Section 4. First aid measures

Skin contact : Dermal contact with rapidly evaporating liquid could result in freezing of the tissues or frostbite.

Frostbite : Try to warm up the frozen tissues and seek medical attention.

Ingestion : Ingestion of liquid can cause burns similar to frostbite.

Over-exposure signs/symptoms

Eye contact : Adverse symptoms may include the following:
frostbite

Inhalation : No specific data.

Skin contact : Adverse symptoms may include the following:
frostbite

Ingestion : Adverse symptoms may include the following:
frostbite

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Specific treatments : No specific treatment.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
halogenated compounds
carbonyl halides

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. For incidents involving large quantities, thermally insulated undergarments and thick textile or leather gloves should be worn.

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Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). May be harmful to the environment if released in large quantities.

Methods and materials for containment and cleaning up

Small spill : Immediately contact emergency personnel. Stop leak if without risk.

Large spill : Immediately contact emergency personnel. Stop leak if without risk. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Do not get in eyes or on skin or clothing. Avoid breathing gas. Avoid release to the environment. Refer to special instructions/safety data sheet. Empty containers retain product residue and can be hazardous. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Keep container tightly closed and sealed until ready for use. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

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Section 8. Exposure controls/personal protection

Ingredient name	Exposure limits
Methane, dichlorodifluoro-	**ACGIH TLV (United States, 3/2012).** TWA: 4950 mg/m³ 8 hours. TWA: 1000 ppm 8 hours. **NIOSH REL (United States, 1/2013).** TWA: 4950 mg/m³ 10 hours. TWA: 1000 ppm 10 hours. **OSHA PEL (United States, 6/2010).** TWA: 4950 mg/m³ 8 hours. TWA: 1000 ppm 8 hours. **OSHA PEL 1989 (United States, 3/1989).** TWA: 4950 mg/m³ 8 hours. TWA: 1000 ppm 8 hours.

Appropriate engineering controls : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. If contact with the liquid is possible, insulated gloves suitable for low temperatures should be worn. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

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Section 9. Physical and chemical properties

Appearance

Physical state : Gas. [Liquefied gas]

Color : Colorless.

Molecular weight : 120.91 g/mole

Molecular formula : C-Cl2-F2

Boiling/condensation point : -29.8°C (-21.6°F)

Melting/freezing point : -158°C (-252.4°F)

Critical temperature : 111.85°C (233.3°F)

Odor : Characteristic.

Odor threshold : Not available.

pH : Not available.

Flash point : [Product does not sustain combustion.]

Burning time : Not applicable.

Burning rate : Not applicable.

Evaporation rate : Not available.

Flammability (solid, gas) : Not available.

Lower and upper explosive (flammable) limits : Not available.

Vapor pressure : 84.9 (psia)

Vapor density : 4.2 (Air = 1)

Specific Volume (ft^3/lb) : 3.1746

Gas Density (lb/ft^3) : 0.315

Relative density : Not applicable.

Solubility : Not available.

Solubility in water : 0.3 g/l

Partition coefficient: n-octanol/water : 2.16

Auto-ignition temperature : Not available.

Decomposition temperature : Not available.

SADT : Not available.

Viscosity : Not applicable.

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : No specific data.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

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Section 10. Stability and reactivity

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Not available.

Irritation/Corrosion

Not available.

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : Liquid can cause burns similar to frostbite.

Inhalation : Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.

Skin contact : Dermal contact with rapidly evaporating liquid could result in freezing of the tissues or frostbite.

Ingestion : Ingestion of liquid can cause burns similar to frostbite.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : Adverse symptoms may include the following:
frostbite

Inhalation : No specific data.

Skin contact : Adverse symptoms may include the following:
frostbite

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Section 11. Toxicological information

Ingestion : Adverse symptoms may include the following:
frostbite

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Methane, dichlorodifluoro-	2.16	6.17	low

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

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Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Empty Airgas-owned pressure vessels should be returned to Airgas. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

United States - RCRA Toxic hazardous waste "U" List

Ingredient	CAS #	Status	Reference number
Dichlorodifluoromethane; Methane, dichlorodifluoro-	75-71-8	Listed	U075

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN1028	UN1028	UN1028	UN1028	UN1028
UN proper shipping name	DICHLORODIFLUOROMETHANE OR REFRIGERANT GAS R 12	DICHLORODIFLUOROMETHANE; OR REFRIGERANT GAS R 12	DICHLORODIFLUOROMETHANE OR REFRIGERANT GAS R 12	DICHLORODIFLUOROMETHANE (REFRIGERANT GAS R 12)	DICHLORODIFLUOROMETHANE
Transport hazard class(es)	2.2	2.2	2.2	2.2	2.2
Packing group	-	-	-	-	-
Environment	No.	No.	No.	No.	No.
Additional information	**Reportable quantity** 5000 lbs / 2270 kg Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements. **Limited quantity** Yes. **Packaging instruction** **Passenger aircraft** Quantity limitation: 75 kg **Cargo aircraft** Quantity limitation: 150 kg **Special provisions** T50	**Explosive Limit and Limited Quantity Index** 0.125 **Passenger Carrying Road or Rail Index** 75	-	-	**Passenger and Cargo Aircraft** Quantity limitation: 75 kg **Cargo Aircraft Only** Quantity limitation: 150 kg

"Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product."

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Section 14. Transport information

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption**: Not determined

TSCA 12(b) annual export notification: dichlorodifluoromethane

United States inventory (TSCA 8b): This material is listed or exempted.

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Sudden release of pressure

Composition/information on ingredients

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
Methane, dichlorodifluoro-	100	No.	Yes.	No.	No.	No.

SARA 313

	Product name	CAS number	%
Form R - Reporting requirements	dichlorodifluoromethane	75-71-8	100
Supplier notification	dichlorodifluoromethane	75-71-8	100

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

State regulations

Massachusetts : This material is listed.

New York : This material is listed.

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Section 15. Regulatory information

New Jersey : This material is listed.

Pennsylvania : This material is listed.

Canada inventory : This material is listed or exempted.

International regulations

International lists : **Australia inventory (AICS)**: This material is listed or exempted.
China inventory (IECSC): This material is listed or exempted.
Japan inventory: This material is listed or exempted.
Korea inventory: This material is listed or exempted.
Malaysia Inventory (EHS Register): Not determined.
New Zealand Inventory of Chemicals (NZIoC): This material is listed or exempted.
Philippines inventory (PICCS): This material is listed or exempted.
Taiwan inventory (CSNN): Not determined.

Chemical Weapons Convention List Schedule I Chemicals : Not listed

Chemical Weapons Convention List Schedule II Chemicals : Not listed

Chemical Weapons Convention List Schedule III Chemicals : Not listed

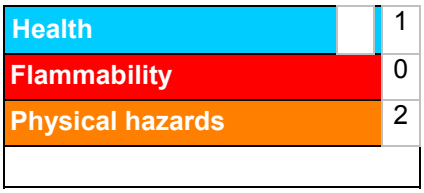
Canada

WHMIS (Canada) : Class A: Compressed gas.
CEPA Toxic substances: This material is listed.
Canadian ARET: This material is not listed.
Canadian NPRI: This material is listed.
Alberta Designated Substances: This material is not listed.
Ontario Designated Substances: This material is not listed.
Quebec Designated Substances: This material is not listed.

Section 16. Other information

Canada Label requirements : Class A: Compressed gas.

Hazardous Material Information System (U.S.A.)



Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on SDSs under 29 CFR 1910. 1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)

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Section 16. Other information

Reprinted with permission from NFPA 704-2001, Identification of the Hazards of Materials for Emergency Response Copyright ©1997, National Fire Protection Association, Quincy, MA 02269. This reprinted material is not the complete and official position of the National Fire Protection Association, on the referenced subject which is represented only by the standard in its entirety.

Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

History

Date of printing : 5/21/2015.

Date of issue/Date of revision : 5/21/2015.

Date of previous issue : 5/21/2015.

Version : 2

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United NationsACGIH – American Conference of Governmental Industrial Hygienists
AIHA – American Industrial Hygiene Association
CAS – Chemical Abstract Services
CEPA – Canadian Environmental Protection Act
CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act (EPA)
CFR – United States Code of Federal Regulations
CPR – Controlled Products Regulations
DSL – Domestic Substances List
GWP – Global Warming Potential
IARC – International Agency for Research on Cancer
ICAO – International Civil Aviation Organisation
Inh – Inhalation
LC – Lethal concentration
LD – Lethal dosage
NDSL – Non-Domestic Substances List
NIOSH – National Institute for Occupational Safety and Health
TDG – Canadian Transportation of Dangerous Goods Act and Regulations
TLV – Threshold Limit Value
TSCA – Toxic Substances Control Act
WEEL – Workplace Environmental Exposure Level
WHMIS – Canadian Workplace Hazardous Material Information System

References : Not available.

Indicates information that has changed from previously issued version.

Other special considerations : WARNING: Contains (Dichlorodifluoromethane), a substance which harms the public health and environment by destroying ozone in the upper atmosphere.

Notice to reader

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Section 16. Other information

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

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SAFETY DATA SHEET

Version 5.5
Revision Date 02/28/2015
Print Date 02/09/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Dieldrin

Product Number : 291218
Brand : Aldrich
Index-No. : 602-049-00-9

CAS-No. : 60-57-1

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 2), H300
Acute toxicity, Dermal (Category 3), H311
Carcinogenicity (Category 2), H351
Specific target organ toxicity - repeated exposure, Oral (Category 1), H372
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H300 Fatal if swallowed.
H311 Toxic in contact with skin.
H351 Suspected of causing cancer.
H372 Causes damage to organs through prolonged or repeated exposure if swallowed.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P201 Obtain special instructions before use.

P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing.
P281	Use personal protective equipment as required.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician. Rinse mouth.
P302 + P352 + P312	IF ON SKIN: Wash with plenty of soap and water. Call a POISON CENTER or doctor/ physician if you feel unwell.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P361	Remove/Take off immediately all contaminated clothing.
P363	Wash contaminated clothing before reuse.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : 1,2,3,4,10,10-Hexachloro-1,4,4a,5,6,7,8,8a-octahydro-6,7-epoxy-1,4:5,8-dimethanonaphthalene

Formula : $C_{12}H_8Cl_6O$

Molecular weight : 380.91 g/mol

CAS-No. : 60-57-1

EC-No. : 200-484-5

Index-No. : 602-049-00-9

Hazardous components

Component	Classification	Concentration
Dieldrin		
	Acute Tox. 2; Acute Tox. 3; Carc. 2; STOT RE 1; Aquatic Acute 1; Aquatic Chronic 1; H300, H311, H351, H372, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.
Storage class (TRGS 510): Non-combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Dieldrin	60-57-1	TWA	0.100000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Central Nervous System impairment Liver damage Reproductive effects Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption		

		TWA	0.250000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen See Appendix A Potential for dermal absorption		
		TWA	0.250000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Skin designation		

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odour	No data available
c)	Odour Threshold	No data available

d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 143 - 144 °C (289 - 291 °F)
f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Mouse - 38.0 mg/kg

LD50 Oral - Dog - 65.0 mg/kg

LD50 Oral - Monkey - 3.0 mg/kg

LD50 Oral - Rabbit - 45.0 mg/kg

LD50 Oral - Pig - 38.0 mg/kg

LD50 Oral - Guinea pig - 49.0 mg/kg

LD50 Oral - Hamster - 60.0 mg/kg

LD50 Oral - Pigeon - 23.7 mg/kg

LD50 Oral - Chicken - 20.0 mg/kg
Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and Taste):Eye:Miosis (pupilliary constriction). Behavioral:Excitement. Behavioral:Food intake (animal).

LD50 Oral - Quail - 10.8 mg/kg
Remarks: Behavioral:Altered sleep time (including change in righting reflex). Behavioral:Somnolence (general depressed activity). Behavioral:Irritability.

LD50 Oral - Duck - 381.0 mg/kg

LD50 Oral - Mammal - 94.0 mg/kg
Remarks: Peripheral Nerve and Sensation:Flaccid paralysis without anesthesia (usually neuromuscular blockage). Behavioral:Tremor. Behavioral:Convulsions or effect on seizure threshold.

LD50 Oral - Bird (wild) - 13.3 mg/kg

LDLO Oral - Rat - 30.0 mg/kg
Remarks: Liver:Other changes.

LDLO Oral - Human - male - 65.0 mg/kg

LDLO Oral - Cat - 500 mg/kg
Remarks: Lungs, Thorax, or Respiration:Chronic pulmonary edema. Liver:Fatty liver degeneration. Kidney, Ureter, Bladder:Other changes.

TDLo Oral - Rat - 140 mg/kg
Remarks: Liver:Other changes. Blood:Other changes. Biochemical:Enzyme inhibition, induction, or change in blood or tissue levels: Other esterases.

TDLo Oral - Rat - 109 mg/kg
Remarks: Liver:Changes in liver weight.

TDLo Oral - Rat - 88 mg/kg
Remarks: Behavioral:Food intake (animal). Nutritional and Gross Metabolic:Weight loss or decreased weight gain. Biochemical:Enzyme inhibition, induction, or change in blood or tissue levels: Phosphatases.

Inhalation: No data available

LD50 Dermal - Rabbit - 250.0 mg/kg

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

Limited evidence of carcinogenicity in animal studies

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (Dieldrin)

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
Ingestion - Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard
No data available

Additional Information
RTECS: IO1750000

Discomfort, Headache, Nausea, Vomiting, Dizziness, Tremors, tonic convulsions, clonic spasms, Coma., respiratory failure, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Blood - Irregularities - Based on Human Evidence
Blood - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	mortality LC50 - Carassius auratus (goldfish) - 1.6 µg/l - 96.0 h
Toxicity to daphnia and other aquatic invertebrates	Immobilization EC50 - Daphnia magna (Water flea) - 79.5 µg/l - 48 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 2811 Class: 6.1 Packing group: I
Proper shipping name: Toxic solids, organic, n.o.s. (Dieldrin)
Reportable Quantity (RQ): 1 lbs
Marine pollutant:yes
Poison Inhalation Hazard: No

IMDG
UN number: 2811 Class: 6.1 Packing group: I EMS-No: F-A, S-A
Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. (Dieldrin)
Marine pollutant:yes

IATA
UN number: 2811 Class: 6.1 Packing group: I
Proper shipping name: Toxic solid, organic, n.o.s. (Dieldrin)
IATA Passenger: Not permitted for transport

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Dieldrin	60-57-1	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Dieldrin	60-57-1	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Dieldrin	60-57-1	1993-04-24

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer. Dieldrin	CAS-No. 60-57-1	Revision Date 2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
H300	Fatal if swallowed.
H311	Toxic in contact with skin.
H351	Suspected of causing cancer.
H372	Causes damage to organs through prolonged or repeated exposure if swallowed.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	4
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.5 Revision Date: 02/28/2015 Print Date: 02/09/2016

SAFETY DATA SHEET

Section 1. Identification

GHS product identifier : CITGO No. 2 Diesel Fuel, All Grades, Low Sulfur

Chemical name : Fuels, diesel, No 2

Synonyms : No. 2-D Grade Diesel Fuel Oil (defined by ASTM D-975); Treated or Refined Diesel Fuel No. 2; Grade 2 Distillate Fuel; Hydrodesulfurized Middle Distillate; C9-C16 Petroleum Hydrocarbons

Material uses : Fuel.

Code : Various

Relevant identified uses of the substance or mixture and uses advised against

Not applicable.

Supplier's details : CITGO Petroleum Corporation
P.O. Box 4689
Houston, TX 77210
sdsvend@citgo.com

Emergency telephone number (with hours of operation) : Technical Contact: (832) 486-4000 (M-F, 8 AM to 4 PM CT)
Medical Emergency: (832) 486-4700 (24 Hr)
CHEMTREC Emergency: (800) 424-9300 (24 Hr)
(United States Only)

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : FLAMMABLE LIQUIDS - Category 3
ACUTE TOXICITY (inhalation) - Category 4
SKIN IRRITATION - Category 2
EYE IRRITATION - Category 2B
CARCINOGENICITY - Category 2
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (central nervous system (CNS)) - Category 2
ASPIRATION HAZARD - Category 1
AQUATIC HAZARD (LONG-TERM) - Category 2

GHS label elements

Hazard pictograms :

Signal word : Danger

Hazard statements : Flammable liquid and vapor.
Harmful if inhaled.
Causes skin and eye irritation.
Suspected of causing cancer.
May be fatal if swallowed and enters airways.
May cause damage to organs through prolonged or repeated exposure. (central nervous system (CNS))
Toxic to aquatic life with long lasting effects.

Precautionary statements

General : Diesel engine exhaust can cause upper respiratory tract irritation and reversible pulmonary effects. Long-term exposure to diesel engine exhaust may cause cancer. Do not syphon by mouth.

Section 2. Hazards identification

Prevention : Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves. Wear eye or face protection. Wear protective clothing. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use explosion-proof electrical, ventilating, lighting and all material-handling equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Keep container tightly closed. Use only outdoors or in a well-ventilated area. Avoid release to the environment. Do not breathe vapor. Wash hands thoroughly after handling.

Response : Collect spillage. Get medical attention if you feel unwell. IF exposed or concerned: Get medical attention. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or physician if you feel unwell. IF SWALLOWED: Immediately call a POISON CENTER or physician. Do NOT induce vomiting. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing and wash it before reuse. If skin irritation occurs: Get medical attention. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical attention.

Storage : Store locked up. Store in a well-ventilated place. Keep cool.

Disposal : Dispose of contents and container in accordance with all local, regional, national and international regulations.

Supplemental label elements : Eliminate sources of ignition. Avoid spark promoters. Ground/bond container and receiving equipment. These alone may be insufficient to remove static electricity. Do not taste or swallow. Wash thoroughly after handling.

Hazards not otherwise classified : Static accumulating flammable liquid can become electrostatically charged even in bonded and grounded equipment. Sparks may ignite liquid and vapor may cause flash fire or explosion. Causes digestive tract burns. Prolonged or repeated contact may dry skin and cause irritation.

Section 3. Composition/information on ingredients

Substance/mixture : Substance

Chemical name : Fuels, diesel, No 2

Other means of identification : No. 2-D Grade Diesel Fuel Oil (defined by ASTM D-975); Treated or Refined Diesel Fuel No. 2; Grade 2 Distillate Fuel; Hydrodesulfurized Middle Distillate; C9-C16 Petroleum Hydrocarbons

CAS number/other identifiers

CAS number : 68476-34-6

Ingredient name	%	CAS number
Benzene, trimethyl-	1 - 5	25551-13-7
Naphthalene	0.5 - 1.5	91-20-3
biphenyl	0.5 - 1.5	92-52-4
Cumene	0.5 - 1.5	98-82-8
Xylene	0.5 - 1.5	1330-20-7
Ethylbenzene	0.5 - 1.5	100-41-4

* = Various ** = Mixture *** = Proprietary

Any concentration shown as a range is to protect confidentiality or is due to process variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Skin contact : Wash skin thoroughly with soap and water or use recognized skin cleanser. Remove contaminated clothing and shoes. Continue to rinse for at least 10 minutes. Get medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : Get medical attention immediately. Call a poison center or physician. Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. Aspiration hazard if swallowed. Can enter lungs and cause damage. Do not induce vomiting. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Causes eye irritation.

Inhalation : Harmful if inhaled.

Skin contact : Causes skin irritation. Defatting to the skin.

Ingestion : Corrosive to the digestive tract. Causes burns. May be fatal if swallowed and enters airways.

Over-exposure signs/symptoms

Eye contact : Adverse symptoms may include the following:
pain or irritation
watering
redness

Inhalation : Repeated or prolonged overexposure to solvents can cause brain or other nervous system damage. The symptoms can include the loss of memory, the loss of intellectual capacity and the loss of coordination.

Skin contact : Adverse symptoms may include the following:
irritation
redness
dryness
cracking

Ingestion : Adverse symptoms may include the following:
stomach pains
nausea or vomiting

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : If ingested, this material presents a significant aspiration and chemical pneumonitis hazard. Induction of emesis is not recommended. Consider activated charcoal and/or gastric lavage. If patient is obtunded, protect the airway by cuffed endotracheal intubation or by placement of the body in a Trendelenburg and left lateral decubitus position.

Specific treatments : Treat symptomatically and supportively.

Section 4. First aid measures

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that gas or vapor is still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use caution when applying carbon dioxide in confined spaces. SMALL FIRE: Steam, CO_2, dry chemical or inert gas (e.g., nitrogen). LARGE FIRE: Use foam, water fog or water spray. Water fog and spray are effective in cooling containers and adjacent structures. However, water can cause frothing and/or may not extinguish the fire. Water can be used to cool the external walls of vessels to prevent excessive pressure, ignition or explosion.

Unsuitable extinguishing media : Do not use water jet.

Specific hazards arising from the chemical : Flammable liquid and vapor. Runoff to sewer may create fire or explosion hazard. This product is a poor conductor of electricity and can become electrostatically charged. If sufficient charge is accumulated, ignition of flammable mixtures can occur. To reduce potential for static discharge, use proper bonding and grounding procedures. This liquid may accumulate static electricity when filling properly grounded containers. Static accumulation may be significantly increased by the presence of small quantities of water or other contaminants. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. The vapor/gas is heavier than air and will spread along the ground. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back. This material is toxic to aquatic life with long lasting effects. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
Diesel engine exhaust

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Section 6. Accidental release measures

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities. Collect spillage.

Methods and materials for containment and cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Large spill : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not swallow. Avoid release to the environment. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Take precautionary measures against electrostatic discharges. Empty containers retain product residue and can be hazardous. Do not reuse container. Handling operations that can promote accumulation of static charges include but are not limited to: mixing, filtering, pumping at high flow rates, splash filling, creating mists or sprays, tank and container filling, tank cleaning, sampling, gauging, switch loading, vacuum truck operations. Restrict flow velocity according to API 2003 (2008), NFPA 77 (2007), and Laurence Britton, “Avoiding Static Ignition Hazards in Chemical Operations”. To reduce potential for static discharge, ensure that all equipment is properly grounded and bonded and meets appropriate electrical classification requirements. Non equilibrium conditions may increase the fire hazard associated with this product. Always bond receiving containers to the fill pipe before and during loading. Always confirm that receiving container is properly grounded. Bonding and grounding alone may be inadequate to eliminate fire and explosion hazards. Carefully review operations that may increase the risks such as tank and container filling, tank cleaning, sampling, gauging, loading, filtering, mixing, agitation, etc. In addition to bonding and grounding, efforts to mitigate the hazards may include, but are not limited to, ventilation, inerting and/or reduction of transfer velocities. Always keep nozzle in contact with the container throughout the loading process. Do NOT fill any portable container in or on a vehicle.

Special precautions, such as reduced loading rates and increased monitoring, must be observed during "switch loading" operations (i.e., loading this material in tanks or shipping compartments that previously contained a dissimilar product).

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Section 7. Handling and storage

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

Bulk Storage Conditions: Maintain all storage tanks in accordance with applicable regulations. Use necessary controls to monitor tank inventories. Inspect all storage tanks on a periodic basis. Test tanks and associated piping for tightness. Maintain the automatic leak detection devices to assure proper working condition.

Head spaces in tanks and other containers may contain a mixture of air and vapor in the flammable range. Vapor may be ignited by static discharge. Storage area must meet OSHA requirements and applicable fire codes. Additional information regarding the design and control of hazards associated with the handling and storage of flammable and combustible liquids may be found in professional and industrial documents including, but not limited to, the National Fire Protection Association (NFPA) publications NFPA 30 ("Flammable and Combustible Liquid Code"), NFPA 77 ("Recommended Practice on Static Electricity") and the American Petroleum Institute (API) Recommended Practice 2003, (“Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents").

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Fuels, diesel, No 2	**ACGIH TLV (United States, 2/2010). Absorbed through skin.** TWA: 100 mg/m³, (measured as total hydrocarbons) 8 hours. Form: Total hydrocarbons
Benzene, trimethyl-	**ACGIH TLV (United States, 3/2017).** TWA: 25 ppm 8 hours. TWA: 123 mg/m³ 8 hours.
Naphthalene	**ACGIH TLV (United States). Absorbed through skin.** STEL: 15 ppm 15 minutes. **ACGIH TLV (United States, 3/2017). Absorbed through skin.** TWA: 10 ppm 8 hours. TWA: 52 mg/m³ 8 hours. **NIOSH REL (United States, 10/2016).** TWA: 10 ppm 10 hours. TWA: 50 mg/m³ 10 hours. STEL: 15 ppm 15 minutes. STEL: 75 mg/m³ 15 minutes. **OSHA PEL (United States, 6/2016).** TWA: 10 ppm 8 hours. TWA: 50 mg/m³ 8 hours.
biphenyl	**OSHA PEL Z2 (United States).** TWA: 0.2 ppm 8 hours. **ACGIH TLV (United States, 3/2017).** TWA: 0.2 ppm 8 hours. TWA: 1.3 mg/m³ 8 hours. **NIOSH REL (United States, 10/2016).** TWA: 1 mg/m³ 10 hours. TWA: 0.2 ppm 10 hours. **OSHA PEL (United States, 6/2016).** TWA: 0.2 ppm 8 hours. TWA: 1 mg/m³ 8 hours.

Section 8. Exposure controls/personal protection

Cumene	**NIOSH REL (United States, 10/2016).** **Absorbed through skin.** TWA: 50 ppm 10 hours. TWA: 245 mg/m³ 10 hours. **ACGIH TLV (United States, 3/2017).** TWA: 50 ppm 8 hours. **OSHA PEL (United States, 6/2016).** **Absorbed through skin.** TWA: 50 ppm 8 hours. TWA: 245 mg/m³ 8 hours.
Xylene	**ACGIH TLV (United States, 3/2017).** TWA: 100 ppm 8 hours. TWA: 434 mg/m³ 8 hours. STEL: 150 ppm 15 minutes. STEL: 651 mg/m³ 15 minutes. **OSHA PEL (United States, 6/2016).** TWA: 100 ppm 8 hours. TWA: 435 mg/m³ 8 hours.
Ethylbenzene	**ACGIH TLV (United States, 3/2017).** TWA: 20 ppm 8 hours. **NIOSH REL (United States, 10/2016).** TWA: 100 ppm 10 hours. TWA: 435 mg/m³ 10 hours. STEL: 125 ppm 15 minutes. STEL: 545 mg/m³ 15 minutes. **OSHA PEL (United States, 6/2016).** TWA: 100 ppm 8 hours. TWA: 435 mg/m³ 8 hours.

Appropriate engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, vapor controls, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety glasses equipped with side shields are recommended as minimum protection in industrial settings. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles. Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If inhalation hazards exist, a full-face respirator may be required instead.

Skin protection

Section 8. Exposure controls/personal protection

Hand protection : Avoid skin contact with liquid. Chemical-resistant gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Recommended: Heavy duty, industrial grade chemically resistant gloves constructed of nitrile, neoprene, polyethylene, fluoroelastomer rubber or polyvinyl chloride as approved by glove manufacturer. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. Leather gloves are not protective for liquid contact.

Body protection : Avoid skin contact with liquid. Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Avoid skin contact with liquid. Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Leather boots are not protective for liquid contact.

Respiratory protection : Avoid inhalation of gases, vapors, mists or dusts. Use a properly fitted, air-purifying or supplied-air respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. If an air purifying respirator is appropriate, use one equipped with cartridges rated for organic vapors.

Section 9. Physical and chemical properties

The conditions of measurement of all properties are at standard temperature and pressure unless otherwise indicated.

Appearance

Physical state : Liquid.

Color : Not available.

Odor : Characteristic.

pH : Not available.

Melting point : -30 to -18°C (-22 to -0.4°F)

Boiling point, initial boiling point, and boiling range : 282 to 338°C (539.6 to 640.4°F)

Flash point : Closed cup: ≥52°C (≥125.6°F) [Pensky-Martens]

Evaporation rate : <1 (butyl acetate = 1)

Lower and upper explosive (flammable) limits : Lower: 0.6%
Upper: 6.5%

Vapor pressure :

Relative vapor density : 5 [Air = 1]

Relative density : 0.84

Density lbs/gal : Estimated 7 lbs/gal

Density gm/cm³ : 0.87 to 0.95 g/cm³

Gravity, °API : Estimated 37 @ 60 F

Solubility : Very slightly soluble in the following materials: cold water.

Solubility in water : 0.005 g/l

Partition coefficient: n-octanol/water : >3.3

Auto-ignition temperature :

Viscosity : Kinematic (room temperature): 0.03 cm^2/s (3 cSt)

Conductivity : <50 picosiemens/meter (unadditized)

Flow time (ISO 2431) : Not available.

Particle characteristics

Median particle size :

Section 10. Stability and reactivity

Reactivity : Not expected to be Explosive, Self-Reactive, Self-Heating, or an Organic Peroxide under US GHS Definition(s).

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow vapor to accumulate in low or confined areas. Do not store with strong oxidizing agents.

Incompatible materials : Reactive or incompatible with the following materials:
oxidizing materials

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Benzene, trimethyl-	LD50 Oral	Rat	8970 mg/kg	-
Naphthalene	LD50 Oral	Rat	490 mg/kg	-
biphenyl	LD50 Dermal	Rabbit	>5010 mg/kg	-
	LD50 Oral	Rat	2140 mg/kg	-
Cumene	LC50 Inhalation Vapor	Mouse	10 g/m³	7 hours
	LD50 Dermal	Rabbit	12300 uL/kg	-
	LD50 Oral	Rat	2.9 g/kg	-
	LD50 Oral	Rat	4000 mg/kg	-
Xylene	LC50 Inhalation Vapor	Rat	5000 ppm	4 hours
	LC50 Inhalation Vapor	Rat	6700 ppm	4 hours
	LD50 Oral	Mouse	2119 mg/kg	-
	LD50 Oral	Rat	4300 mg/kg	-
	LD50 Oral	Rat	4300 mg/kg	-
Ethylbenzene	LD50 Dermal	Rabbit	>5000 mg/kg	-
	LD50 Oral	Rat	3500 mg/kg	-

Conclusion/Summary : No additional information.

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
Benzene, trimethyl-	Eyes - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
	Skin - Moderate irritant	Rabbit	-	24 hours 500 milligrams	-
Naphthalene	Skin - Mild irritant	Rabbit	-	495 milligrams	-
biphenyl	Eyes - Mild irritant	Rabbit	-	100 milligrams	-
	Skin - Severe irritant	Rabbit	-	24 hours 500 microliters	-
Cumene	Eyes - Mild irritant	Rabbit	-	86 milligrams	-
	Skin - Mild irritant	Rabbit	-	24 hours 10 milligrams	-
Xylene	Skin - Mild irritant	Rat	-	8 hours 60 microliters	-

Section 11. Toxicological information

	Skin - Moderate irritant	Rabbit	-	24 hours 500 milligrams	-
	Skin - Moderate irritant	Rabbit	-	100 Percent	-
Ethylbenzene	Skin - Mild irritant	Rabbit	-	24 hours 15 milligrams	-

Skin : No additional information.

Eyes : No additional information.

Respiratory : No additional information.

Sensitization

Not available.

Skin : No additional information.

Respiratory : No additional information.

Mutagenicity

Not available.

Conclusion/Summary : No additional information.

Carcinogenicity

Not available.

Conclusion/Summary : **Diesel exhaust particulate**: Lung tumor and lymphomas were identified in rats and mice exposed to unflitered diesel fuel exhaust in chronic inhalation studies. Further, epidemiological studies have identified increase incidences of lung cancer in US railroad workers and bladder cancer in bus and truck drivers possibly associated with exposure to diesel engine exhaust. NTP has determined that exposure to diesel exhaust particulates, a complex mixture of combustion products of diesel fuel, is reasonably anticipated to be a human carcinogen. In addition, NIOSH has identified complete diesel exhaust as a potential carcinogen.

Classification

Product/ingredient name	OSHA	IARC	NTP
Fuels, diesel, No 2	-	3	-
Diesel exhaust particulate	-	1	Reasonably anticipated to be a human carcinogen.
Naphthalene	-	2B	Reasonably anticipated to be a human carcinogen.
Cumene	-	2B	Reasonably anticipated to be a human carcinogen.
Xylene	-	3	-
Ethylbenzene	-	2B	-

Reproductive toxicity

Not available.

Conclusion/Summary : No additional information.

Teratogenicity

Not available.

Conclusion/Summary : No additional information.

Specific target organ toxicity (single exposure)

Name	Category	Route of exposure	Target organs
Benzene, trimethyl-	Category 3	Not applicable.	Respiratory tract irritation and Narcotic effects
biphenyl	Category 3	Not applicable.	Respiratory tract irritation
Cumene	Category 3	Not applicable.	Respiratory tract irritation
Ethylbenzene	Category 3	Not applicable.	Respiratory tract irritation

Section 11. Toxicological information

Specific target organ toxicity (repeated exposure)

Name	Category	Route of exposure	Target organs
Benzene, trimethyl-	Category 2	Not determined	central nervous system (CNS)
Xylene	Category 2	Not determined	hearing organs

Aspiration hazard

Name	Result
Benzene, trimethyl-	ASPIRATION HAZARD - Category 1
Cumene	ASPIRATION HAZARD - Category 1
Ethylbenzene	ASPIRATION HAZARD - Category 1

Information on the likely routes of exposure : Routes of entry anticipated: Dermal, Inhalation.

Potential acute health effects

Eye contact : Causes eye irritation.

Inhalation : Harmful if inhaled.

Skin contact : Causes skin irritation. Defatting to the skin.

Ingestion : Corrosive to the digestive tract. Causes burns. May be fatal if swallowed and enters airways.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : Adverse symptoms may include the following:
pain or irritation
watering
redness

Inhalation : Repeated or prolonged overexposure to solvents can cause brain or other nervous system damage. The symptoms can include the loss of memory, the loss of intellectual capacity and the loss of coordination.

Skin contact : Adverse symptoms may include the following:
irritation
redness
dryness
cracking

Ingestion : Adverse symptoms may include the following:
stomach pains
nausea or vomiting

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : May cause damage to organs through prolonged or repeated exposure.

Carcinogenicity : Suspected of causing cancer. Risk of cancer depends on duration and level of exposure.

Mutagenicity : No known significant effects or critical hazards.

Section 11. Toxicological information

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

N/A

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
Benzene, trimethyl-	Acute LC50 5600 µg/l Marine water	Crustaceans - Palaemonetes pugio	48 hours
Naphthalene	Acute EC50 1.6 ppm Fresh water	Daphnia - Daphnia magna	48 hours
	Acute LC50 2350 µg/l Marine water	Crustaceans - Palaemonetes pugio	48 hours
	Acute LC50 213 µg/l Fresh water	Fish - Melanotaenia fluviatilis - Larvae	96 hours
	Chronic NOEC 0.5 mg/l Marine water	Crustaceans - Uca pugnax - Adult	3 weeks
	Chronic NOEC 1.5 mg/l Fresh water	Fish - Oreochromis mossambicus	60 days
biphenyl	Acute LC50 360 µg/l Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 1450 µg/l Fresh water	Fish - Pimephales promelas	96 hours
	Chronic NOEC 0.17 mg/l Fresh water	Daphnia - Daphnia magna - Neonate	21 days
	Chronic NOEC 0.229 mg/l Fresh water	Fish - Oncorhynchus mykiss	87 days
Cumene	Acute EC50 2600 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	72 hours
	Acute EC50 7400 µg/l Fresh water	Crustaceans - Artemia sp. - Nauplii	48 hours
	Acute EC50 10600 µg/l Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 2700 µg/l Fresh water	Fish - Oncorhynchus mykiss	96 hours
Xylene	Acute EC50 90 mg/l Fresh water	Crustaceans - Cypris subglobosa	48 hours
	Acute LC50 8.5 ppm Marine water	Crustaceans - Palaemonetes pugio - Adult	48 hours
	Acute LC50 8500 µg/l Marine water	Crustaceans - Palaemonetes pugio	48 hours
	Acute LC50 15700 µg/l Fresh water	Fish - Lepomis macrochirus - Juvenile (Fledgling, Hatchling, Weanling)	96 hours
	Acute LC50 19000 µg/l Fresh water	Fish - Lepomis macrochirus	96 hours
	Acute LC50 13400 µg/l Fresh water	Fish - Pimephales promelas	96 hours
	Acute LC50 16940 µg/l Fresh water	Fish - Carassius auratus	96 hours
Ethylbenzene	Acute EC50 4600 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	72 hours
	Acute EC50 3600 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	96 hours
	Acute EC50 6530 µg/l Fresh water	Crustaceans - Artemia sp. - Nauplii	48 hours
	Acute EC50 2930 µg/l Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 4200 µg/l Fresh water	Fish - Oncorhynchus mykiss	96 hours

Conclusion/Summary : Not available.

Persistence and degradability

Section 12. Ecological information

Not available.

Conclusion/Summary : Not available.

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Fuels, diesel, No 2	>3.3	-	low
Benzene, trimethyl-	3.4 to 3.8	-	low
Naphthalene	3.4	36.5 to 168	low
biphenyl	4.008	1900	high
Cumene	3.55	35.48	low
Xylene	3.12	8.1 to 25.9	low
Ethylbenzene	3.6	-	low

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

RCRA classification : D001, D018

Section 14. Transport information

	DOT Classification	IMDG	IATA
UN number	NA1993	UN1202	UN1202
UN proper shipping name	Diesel Fuel	DIESEL FUEL	Diesel Fuel
Transport hazard class(es)	3	3	3
Packing group	III	III	III
Environmental hazards	No.	No.	No.

Additional information

Section 14. Transport information

DOT Classification : This product may be re-classified as "Combustible Liquid," unless transported by vessel or aircraft. Non-bulk packages (less than or equal to 119 gal) of combustible liquids are not regulated as hazardous materials in package sizes less than the product reportable quantity.
Reportable quantity 11223.3 lbs / 5095.4 kg [1479.2 gal / 5599.3 L]. Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.
Limited quantity Yes.
Packaging instruction Exceptions: 150. Non-bulk: 203. Bulk: 242.
Quantity limitation Passenger aircraft/rail: 60 L. Cargo aircraft: 220 L.
Special provisions 144, B1, IB3, T4, TP1, TP29
Remarks 49 CFR 173.150 (f)(1) states that a flammable liquid with a flash point at or above 38ºC (100ºF) that does not meet the definition of any other hazard class may be reclassed as a combustible liquid. This provision does not apply to transportation by vessel or aircraft except where other means of transportaion is impracticable.

TDG Classification : Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.18-2.19 (Class 3).

IMDG : **Emergency schedules** F-E, S-E
Special provisions 363

IATA : **Quantity limitation** Passenger and Cargo Aircraft: 60 L. Packaging instructions: 355. Cargo Aircraft Only: 220 L. Packaging instructions: 366. Limited Quantities - Passenger Aircraft: 10 L. Packaging instructions: Y344.
Special provisions A3

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to IMO instruments : Not available.

Section 15. Regulatory information

U.S. Federal regulations :

United States inventory (TSCA 8b): All components are listed or exempted.

Clean Water Act (CWA) 307: naphthalene; ethylbenzene; toluene; benzene

Clean Water Act (CWA) 311: naphthalene; xylene; ethylbenzene; toluene; benzene

This material is classified as an oil under Section 311 of the Clean Water Act (CWA) and the Oil Pollution Act of 1990 (OPA). Discharges or spills which produce a visible sheen on waters of the United States, their adjoining shorelines, or into conduits leading to surface waters must be reported to the EPA's National Response Center at (800) 424-8802.

SARA 302/304

Composition/information on ingredients

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : FLAMMABLE LIQUIDS - Category 3
ACUTE TOXICITY (inhalation) - Category 4
SKIN IRRITATION - Category 2
EYE IRRITATION - Category 2B
CARCINOGENICITY - Category 2
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (central nervous system (CNS)) - Category 2
ASPIRATION HAZARD - Category 1
HNOC - Corrosive to digestive tract
HNOC - Static-accumulating flammable liquid

Composition/information on ingredients

Section 15. Regulatory information

Name	%	Classification
Fuels, diesel, No 2	>99	FLAMMABLE LIQUIDS - Category 3 ACUTE TOXICITY (inhalation) - Category 4 SKIN IRRITATION - Category 2 EYE IRRITATION - Category 2B CARCINOGENICITY - Category 2 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (central nervous system (CNS)) - Category 2 ASPIRATION HAZARD - Category 1 HNOC - Corrosive to digestive tract HNOC - Static-accumulating flammable liquid
Diesel exhaust particulate	1 - 5	CARCINOGENICITY (inhalation) - Category 2
Benzene, trimethyl-	1 - 5	FLAMMABLE LIQUIDS - Category 3 ACUTE TOXICITY (inhalation) - Category 4 SKIN IRRITATION - Category 2 EYE IRRITATION - Category 2A SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (central nervous system (CNS)) - Category 2 ASPIRATION HAZARD - Category 1
Naphthalene	0.5 - 1.5	FLAMMABLE SOLIDS - Category 2 ACUTE TOXICITY (oral) - Category 4 CARCINOGENICITY - Category 2
biphenyl	0.5 - 1.5	SKIN IRRITATION - Category 2 EYE IRRITATION - Category 2A SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3
Cumene	0.5 - 1.5	FLAMMABLE LIQUIDS - Category 3 EYE IRRITATION - Category 2A CARCINOGENICITY (inhalation) - Category 2 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3 ASPIRATION HAZARD - Category 1
Xylene	0.5 - 1.5	FLAMMABLE LIQUIDS - Category 3 ACUTE TOXICITY (inhalation) - Category 4 SKIN IRRITATION - Category 2 EYE IRRITATION - Category 2A SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (hearing organs) - Category 2
Ethylbenzene	0.5 - 1.5	FLAMMABLE LIQUIDS - Category 2 SKIN IRRITATION - Category 2 EYE IRRITATION - Category 2A CARCINOGENICITY (inhalation) - Category 2 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3 ASPIRATION HAZARD - Category 1

SARA 313

	Product name	CAS number	%
Form R - Reporting requirements	naphthalene ethylbenzene	91-20-3 100-41-4	<1 <1
Supplier notification	naphthalene ethylbenzene	91-20-3 100-41-4	<1 <1

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

State regulations

Massachusetts : The following components are listed: ethyltoluene; trimethylbenzene

Section 15. Regulatory information

New York : The following components are listed: Naphthalene; Cumene; Benzene, 1-methylethyl-; Ethylbenzene

New Jersey : The following components are listed: ETHYLTOLUENES; BENZENE, ETHYLMETHYL-; TRIMETHYL BENZENE (mixed isomers); BENZENE, TRIMETHYL-; NAPHTHALENE; MOTH FLAKES; cumene; ethylbenzene

Pennsylvania : The following components are listed: ethyltoluene; trimethylbenzene; NAPHTHALENE; cumene; ethylbenzene

California Prop. 65 Clear and Reasonable Warnings (2018)

⚠ **WARNING**: This product can expose you to Benzene, which is known to the State of California to cause cancer and birth defects or other reproductive harm. This product can expose you to chemicals including Diesel exhaust particulate, Naphthalene, Cumene, Ethylbenzene, which are known to the State of California to cause cancer, and Toluene, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

Ingredient name	%	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
Diesel exhaust particulate	<3	Yes.	No.	-	-
naphthalene	<1	Yes.	No.	Yes.	-
cumene	<1	Yes.	No.	-	-
ethylbenzene	<1	Yes.	No.	Yes.	-
toluene	<0.1	No.	Yes.	-	Yes.
benzene	<0.1	Yes.	Yes.	Yes.	Yes.

International regulations

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

Inventory list

United States : All components are listed or exempted.

Australia : All components are listed or exempted.

Canada : All components are listed or exempted.

China : All components are listed or exempted.

Japan : **Japan inventory (CSCL)**: All components are listed or exempted.
Japan inventory (ISHL): Not determined.

Malaysia : Not determined.

New Zealand : All components are listed or exempted.

Philippines : All components are listed or exempted.

Republic of Korea : All components are listed or exempted.

Taiwan : Not determined.

Thailand : Not determined.

Turkey : Not determined.

Viet Nam : Not determined.

Section 16. Other information

National Fire Protection Association (U.S.A.)

Section 16. Other information

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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Procedure used to derive the classification

Classification	Justification
FLAMMABLE LIQUIDS - Category 3	Expert judgment
ACUTE TOXICITY (inhalation) - Category 4	Expert judgment
SKIN IRRITATION - Category 2	Expert judgment
EYE IRRITATION - Category 2B	Expert judgment
CARCINOGENICITY - Category 2	Expert judgment
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (central nervous system (CNS)) - Category 2	Calculation method
ASPIRATION HAZARD - Category 1	Expert judgment
AQUATIC HAZARD (LONG-TERM) - Category 2	Expert judgment

History

Date of printing : 10/3/2023

Date of issue/Date of revision : 8/17/2023

Date of previous issue : No previous validation

Version : 1

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

References : Not available.

Indicates information that has changed from previously issued version.

Notice to reader

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SAFETY DATA SHEET

Version 6.14
Revision Date 09/06/2024
Print Date 09/06/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Dioctyl phthalate

Product Number : D201154
Brand : Aldrich
Index-No. : 607-317-00-9
CAS-No. : 117-81-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Reproductive toxicity (Category 1B), H360

For the full text of the H-Statements mentioned in this Section, see Section 16.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal Word Danger

Hazard Statements

H360 May damage fertility or the unborn child.

Precautionary Statements

P201 Obtain special instructions before use.

P202 Do not handle until all safety precautions have been read and understood.

P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

P308 + P313 IF exposed or concerned: Get medical advice/ attention.

P405 Store locked up.

P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Endocrine disrupting chemical(s)

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms : Bis(2-ethylhexyl) phthalate
Phthalic acid bis(2-ethylhexyl ester)

Formula : $C_{24}H_{38}O_4$
Molecular weight : 390.56 g/mol
CAS-No. : 117-81-7
EC-No. : 204-211-0
Index-No. : 607-317-00-9

Component	Classification	Concentration
Bis(2-ethylhexyl) phthalate		
	Repr. 1B; H360	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Call in physician.

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In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

In case of eye contact
After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

If swallowed
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Foam Carbon dioxide (CO2) Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Carbon oxides
Combustible.
Vapors are heavier than air and may spread along floors.
Forms explosive mixtures with air on intense heating.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information
Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

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6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling

Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

Hygiene measures

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions

Tightly closed. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.

Storage class

Storage class (TRGS 510): 6.1C: Combustible, acute toxic Cat.3 / toxic compounds or compounds which causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Bis(2-ethylhexyl) phthalate	117-81-7	TWA	0.1 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption		
		TWA	5 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen		

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		ST	10 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen		
		TWA	5 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		PEL	5 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Bis(2-ethylhexyl) phthalate	117-81-7	Mono(2-ethylhexyl) phthalate	5µg/g creatinine	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift			
		Mono(2-ethyl-5-hydroxyhexyl)phthalate	20µg/g creatinine	Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift			
		Mono(2-ethyl-5-oxohexyl)phthalate	15µg/g creatinine	Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift			
		Mono(2-ethyl-5-carboxypentyl)phthalate	25µg/g creatinine	Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift			
		Mono(2-carboxymethyl-hexyl)phthalate		Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift			

8.2 Exposure controls

Appropriate engineering controls
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

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Body Protection
protective clothing

Respiratory protection
Recommended Filter type: Filter type ABEK
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when vapours/aerosols are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: oily Color: colorless
b)	Odor	odorless
c)	Odor Threshold	Not applicable
d)	pH	at 20 °C (68 °F)neutral
e)	Melting point/freezing point	Melting point/ range: -50 °C (-58 °F) - lit.
f)	Initial boiling point and boiling range	384 °C 723 °F - lit.
g)	Flash point	207 °C (405 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Lower explosion limit: 0.3 %(V)
k)	Vapor pressure	1.6 hPa at 93.0 °C (199.4 °F)
l)	Vapor density	No data available
m)	Density	0.985 g/cm3 at 25 °C (77 °F) - lit.
	Relative density	No data available
n)	Water solubility	ca.0.086 g/l at 25 °C (77 °F) - OECD Test Guideline 105 - insoluble
o)	Partition coefficient: n-octanol/water	No data available

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p)	Autoignition temperature	390.0 °C (734.0 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	ca.78.17 mm2/s at 20 °C (68 °F) - OECD Test Guideline 114 -
s)	Explosive properties	No data available
t)	Oxidizing properties	none

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
Forms explosive mixtures with air on intense heating.
A range from approx. 15 Kelvin below the flash point is to be rated as critical.

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
Violent reactions possible with:
Strong oxidizing agents

10.4 Conditions to avoid
Strong heating.

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 30,000 mg/kg
Remarks: (RTECS)
LC0 Inhalation - Rat - male and female - 4 h - > 10.62 mg/l - vapor

(OECD Test Guideline 403)
Remarks: (highest concentration to be prepared)
LD50 Dermal - Rabbit - 19,800 mg/kg
Remarks: (ECHA)

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Skin corrosion/irritation
Skin - Rabbit
Result: slight irritation - 4 h
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation - 72 h
(OECD Test Guideline 405)

Respiratory or skin sensitization
Maximization Test - Guinea pig
Result: negative
(OECD Test Guideline 406)

Germ cell mutagenicity
Test Type: In vitro mammalian cell gene mutation test
Test system: Mouse lymphoma test
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
Result: negative
Test Type: Ames test
Test system: Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative
Test Type: Mutagenicity (mammal cell test): chromosome aberration.
Test system: Chinese hamster ovary cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 473
Result: negative
Test Type: sister chromatid exchange assay
Test system: Chinese hamster ovary cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 479
Result: negative
Test Type: Micronucleus test
Test system: Chinese hamster lung cells
Metabolic activation: with and without metabolic activation
Result: negative
Remarks: (ECHA)

Test Type: Chromosome aberration test
Species: Rat
Cell type: Bone marrow
Application Route: Oral
Method: OECD Test Guideline 475
Result: negative

Test Type: unscheduled DNA synthesis assay
Species: Rat
Cell type: Liver cells
Application Route: Oral

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Method: OECD Test Guideline 486
Result: negative

Carcinogenicity
This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Bis(2-ethylhexyl) phthalate)

NTP: RAHC - Reasonably anticipated to be a human carcinogen (Bis(2-ethylhexyl) phthalate)

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
May damage the unborn child.
May damage fertility.

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

Repeated dose toxicity - Rat - male and female - Oral - 104 Weeks - NOAEL (No observed adverse effect level) - 28.9 mg/kg

RTECS: TI0350000
Effects due to ingestion may include:, Gastrointestinal disturbance
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Kidney -

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	flow-through test LC50 - Pimephales promelas (fathead minnow) - > 0.67 mg/l - 96 h (OECD Test Guideline 203) Remarks: (above the solubility limit in the test medium)
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - > 0.16 mg/l - 48 h Remarks: (ECOTOX Database)
Toxicity to algae	EC50 - Pseudokirchneriella subcapitata - > 0.003 mg/l - 72 h (OECD Test Guideline 201)
Toxicity to bacteria	static test NOEC - activated sludge - 1,000 mg/l - 3 h

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	(OECD Test Guideline 209)
Toxicity to fish(Chronic toxicity)	flow-through test NOEC - Pimephales promelas (fathead minnow) - 23.8 mg/l - 32 d Remarks: (above the solubility limit in the test medium) (ECOTOX Database)
Toxicity to daphnia and other aquatic invertebrates(Chronic toxicity)	flow-through test NOEC - Daphnia magna (Water flea) - 0.158 mg/l - 21 d (OECD Test Guideline 211) Remarks: (above the solubility limit in the test medium)

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 29 d Result: ca.82 % - Readily biodegradable. (OECD Test Guideline 301B)

12.3 Bioaccumulative potential

Bioaccumulation	Oncorhynchus mykiss (rainbow trout) - 100 d - 0.014 mg/l(Bis(2-ethylhexyl) phthalate) Bioconcentration factor (BCF): 113 Remarks: Does not bioaccumulate.

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties

No data available

12.7 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

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SECTION 14: Transport information

DOT (US)
UN number: 3082 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, liquid, n.o.s. (Bis(2-ethylhexyl) phthalate)
Reportable Quantity (RQ): 100 lbs
Poison Inhalation Hazard: No

IMDG
Not dangerous goods

IATA
Not dangerous goods

Further information
Not classified as dangerous in the meaning of transport regulations.

SECTION 15: Regulatory information

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
Bis(2-ethylhexyl) phthalate	117-81-7	100	100

SARA 304 Extremely Hazardous Substances Reportable Quantity
This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity
This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Chronic Health Hazard

SARA 313 : The following components are subject to reporting levels established by SARA Title III, Section 313:

Bis(2-ethylhexyl) phthalate	117-81-7	>= 90 - <= 100 %

US State Regulations

Massachusetts Right To Know
Bis(2-ethylhexyl) phthalate 117-81-7

Pennsylvania Right To Know
Bis(2-ethylhexyl) phthalate 117-81-7

Maine Chemicals of High Concern
Product does not contain any listed chemicals

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Vermont Chemicals of High Concern

Bis(2-ethylhexyl) phthalate	117-81-7

Washington Chemicals of High Concern

Bis(2-ethylhexyl) phthalate	117-81-7

California Prop. 65

WARNING: This product can expose you to chemicals including Bis(2-ethylhexyl) phthalate, which is/are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

The ingredients of this product are reported in the following inventories:

TSCA : All substances listed as active on the TSCA inventory

TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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MATHESON
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Safety Data Sheet

Material Name: ETHYL BENZENE **SDS ID: MAT08780**

Section 1 - PRODUCT AND COMPANY IDENTIFICATION

Material Name
ETHYL BENZENE
Synonyms
MTG MSDS 185; EB; PHENYLETHANE; ETHYLBENZENE; ETHYLBENZOL; ALPHA-METHYLTOLUENE; UN 1175; C8H10
Chemical Family
Hydrocarbons, aromatic
Product Use
industrial.
Restrictions on Use
None known.
Details of the supplier of the safety data sheet
MATHESON TRI-GAS, INC.
150 Allen Road, Suite 302
Basking Ridge, NJ 07920
General Information: 1-800-416-2505
Emergency #: 1-800-424-9300 (CHEMTREC)
Outside the US: 703-527-3887 (Call collect)

Section 2 - HAZARDS IDENTIFICATION

Classification in accordance with paragraph (d) of 29 CFR 1910.1200.
Flammable Liquids - Category 2
Aspiration Hazard - Category 1
Acute Toxicity - Inhalation - Dust/Mist - Category 4
Acute Toxicity - Inhalation - Vapor - Category 4
Skin Corrosion/Irritation - Category 2
Serious Eye Damage/Eye Irritation - Category 2A
Carcinogenicity - Category 2
Reproductive Toxicity - Category 1B
Specific target organ toxicity - Single exposure - Category 2
Specific target organ toxicity - Single exposure - Category 3
Specific Target Organ Toxicity - Repeated Exposure - Category 2 (ears , Ears)
Hazardous to the Aquatic Environment - Acute - Category 2
Hazardous to the Aquatic Environment - Chronic - Category 2
GHS Label Elements
Symbol(s)

Signal Word
Danger
Hazard Statement(s)

Highly flammable liquid and vapor.
Harmful if inhaled.
Causes skin irritation.
Causes serious eye irritation.
Suspected of causing cancer.
May damage fertility or the unborn child.
May cause damage to organs. (central nervous system)
May cause respiratory irritation.
May be fatal if swallowed and enters airways.
Toxic to aquatic life.

Precautionary Statement(s)

Prevention

Keep away from heat, sparks, open flame, and hot surfaces - No smoking.
Keep container tightly closed.
Ground/Bond container and receiving equipment.
Use explosion-proof electrical/ventilating/lighting equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Use Personal Protective equipment as required.
Do not breathe vapor or mist.
Use only outdoors or in a well-ventilated area.
Wear protective gloves and eye/face protection.
Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.
Avoid release to the environment.

Response

In case of fire, use media appropriate for extinction.
IF exposed or concerned: Get medical advice/attention.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
Call a POISON CENTER or doctor/physician if you feel unwell.
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
If skin irritation occurs: Get medical advice/attention.
Wash contaminated clothing before reuse.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do.
Continue rinsing.
If eye irritation persists: Get medical advice/attention.
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
Do NOT induce vomiting.

Storage

Store in a well-ventilated place.
Keep cool.
Keep container tightly closed.
Store locked up.

Disposal

Dispose in accordance with all applicable regulations.

Statement(s) of Unknown Acute Toxicity

Inhalation 0% of the mixture consists of ingredient(s) of unknown acute toxicity.

Statement(s) of Unknown Aquatic Toxicity
0% of the mixture consists of ingredient(s) of unknown acute aquatic toxicity.
0% of the mixture consists of ingredient(s) of unknown chronic aquatic toxicity.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

CAS	Component Name	Percent
100-41-4	ETHYL BENZENE	100

Section 4 - FIRST AID MEASURES

Inhalation
If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.
Skin
Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.
Eyes
Flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Then get immediate medical attention.
Ingestion
aspiration hazard. Do NOT induce vomiting. When vomiting occurs, keep head lower than hips to help prevent aspiration. Get medical attention immediately. Give artificial respiration if not breathing.
Most Important Symptoms/Effects
Acute
respiratory tract irritation, skin irritation, eye irritation, central nervous system damage, lung damage (from aspiration)
Delayed
cancer, Reproductive Effects
Note to Physicians
For inhalation, consider oxygen.

Section 5 - FIRE FIGHTING MEASURES

Extinguishing Media
Suitable Extinguishing Media
regular dry chemical, carbon dioxide, water spray, regular foam, Large fires: Use water spray, fog or regular foam.
Unsuitable Extinguishing Media
Do not use high-pressure water streams.
Special Hazards Arising from the Chemical
Severe fire hazard. Vapor/air mixtures are explosive above flash point. The vapor is heavier than air. Vapors or gases may ignite at distant ignition sources and flash back. Electrostatic discharges may be generated by flow or agitation resulting in ignition or explosion.
Hazardous Combustion Products
Oxides of carbon
Fire Fighting Measures
Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. For fires in cargo or storage area: Cool containers with water from unmanned hose holder or monitor nozzles until well after fire is out. If this is impossible then take the following precautions: Keep unnecessary people away, isolate hazard area and deny entry. Let the fire burn. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. For tank,

rail car or tank truck: Evacuation radius: 800 meters (1/2 mile). Do not attempt to extinguish fire unless flow of material can be stopped first. Flood with fine water spray. Do not scatter spilled material with high-pressure water streams. Cool containers with water spray until well after the fire is out. Apply water from a protected location or from a safe distance. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas. Water may be ineffective.

Special Protective Equipment and Precautions for Firefighters

Wear full protective fire fighting gear including self contained breathing apparatus (SCBA) for protection against possible exposure.

Section 6 - ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

Wear personal protective clothing and equipment, see Section 8.

Methods and Materials for Containment and Cleaning Up

Avoid heat, flames, sparks and other sources of ignition. Eliminate all ignition sources if safe to do so. All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Stop leak if possible without personal risk. Prevent entry into waterways, sewers, basements, or confined areas. Reduce vapors with water spray. Absorb with sand or other non-combustible material. Collect spilled material in appropriate container for disposal. Dike for later disposal. Remove sources of ignition. Use water spray to reduce vapors or divert vapor cloud drift. Keep unnecessary people away, isolate hazard area and deny entry. Notify Local Emergency Planning Committee and State Emergency Response Commission for release greater than or equal to RQ (U.S. SARA Section 304). If release occurs in the U.S. and is reportable under CERCLA Section 103, notify the National Response Center at (800)424-8802 (USA) or (202)426-2675 (USA).

Environmental Precautions

Avoid release to the environment.

Section 7 - HANDLING AND STORAGE

Precautions for Safe Handling

Keep away from heat, sparks, open flame, and hot surfaces - No smoking. Keep container tightly closed. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting equipment. Use only non-sparking tools. Take precautionary measures against static discharges. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use Personal Protective equipment as required. Do not breathe vapor or mist. Use only outdoors or in a well-ventilated area. Wear protective gloves/eye protection/face protection. Wash hands thoroughly after handling. Do not eat, drink, or smoke when using this product. Avoid release to the environment.

Conditions for Safe Storage, Including any Incompatibilities

Store in a well-ventilated place.
Keep cool.
Keep container tightly closed.
Store locked up.
Store and handle in accordance with all current regulations and standards. Store in a well-ventilated area. Keep cool. Keep container tightly closed. Keep locked up. Grounding and bonding required. Keep separated from incompatible substances. Protect from physical damage. Store outside or in a detached building. Store with flammable liquids. Subject to storage regulations: U.S. OSHA 29 CFR 1910.106.

Incompatible Materials

Acids, bases, oxidizing materials, combustible materials

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Component Exposure Limits

ETHYL BENZENE	**100-41-4**

ACGIH:	20 ppm TWA
NIOSH:	100 ppm TWA ; 435 mg/m3 TWA
	125 ppm STEL ; 545 mg/m3 STEL
	800 ppm IDLH (10% LEL)
Europe:	100 ppm TWA ; 442 mg/m3 TWA
	Possibility of significant uptake through the skin
	200 ppm STEL ; 884 mg/m3 STEL
OSHA (US):	100 ppm TWA ; 435 mg/m3 TWA
Mexico:	100 ppm TWA VLE-PPT ; 435 mg/m3 TWA VLE-PPT
	125 ppm STEL [PPT-CT]; 545 mg/m3 STEL [PPT-CT]

ACGIH - Threshold Limit Values - Biological Exposure Indices (BEI)
ETHYL BENZENE (100-41-4)
0.15 g/g creatinine Medium: urine Time: end of shift Parameter: Sum of mandelic acid and phenylglyoxylic acid (nonspecific)

Engineering Controls
Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

Individual Protection Measures, such as Personal Protective Equipment

Eye/face protection
Wear splash resistant safety goggles with a faceshield. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

Skin Protection
Wear appropriate chemical resistant clothing.

Respiratory Protection
The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA. 800 ppm. Any air-purifying half-mask respirator equipped with organic vapor cartridge(s). Any air-purifying full-facepiece respirator (gas mask) with a chin-style, front-mounted or back-mounted organic vapor canister. Any powered, air-purifying respirator with organic vapor cartridge(s). Any supplied-air respirator. Any self-contained breathing apparatus with a full facepiece. Emergency or planned entry into unknown concentrations or IDLH conditions -. Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode. Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode. Escape -. Any air-purifying full-facepiece respirator (gas mask) with a chin-style, front-mounted or back-mounted organic vapor canister. Any appropriate escape-type, self-contained breathing apparatus. Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode. Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

Glove Recommendations
Wear appropriate chemical resistant gloves.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Clear, colorless liquid	**Physical State**	liquid
Odor	aromatic odor	**Color**	colorless
Odor Threshold	140 ppm	**pH**	Not available
Melting Point	-95 °C (-139 °F)	**Boiling Point**	136 °C (277 °F)
Boiling Point Range	Not available	**Freezing point**	Not available
Evaporation Rate	<1 (Butyl acetate = 1)	**Flammability (solid, gas)**	Not available
Autoignition Temperature	432 °C (810 °F)	**Flash Point**	15 °C Closed Cup (59 °F)
Lower Explosive Limit	0.8 %	**Decomposition temperature**	Not available
Upper Explosive Limit	6.7 %	**Vapor Pressure**	7.1 mmHg @ 20 °C
Vapor Density (air=1)	3.66	**Specific Gravity (water=1)**	0.867
Water Solubility	0.015 %	**Partition coefficient: n-octanol/water**	154170.05
Viscosity	0.64 cp	**Kinematic viscosity**	Not available
Solubility (Other)	Not available	**Bioconcentration Factor (BCF)**	36.39
Density	Not available	**Henry's Law Constant**	0.00788 atm-m3/mole
KOC	520 (Estimated)	**Physical Form**	liquid
Volatility	100 %	**Molecular Formula**	C-H3-C-H2-C6-H5
Molecular Weight	106.17	**OSHA Flammability Class**	IB

Solvent Solubility
Soluble
alcohol, ether, Benzene, sulfur dioxide, carbon tetrachloride
Insoluble
ammonia

Section 10 - STABILITY AND REACTIVITY

Reactivity
No reactivity hazard is expected.
Chemical Stability
Stable at normal temperatures and pressure.

Possibility of Hazardous Reactions
Will not polymerize.
Conditions to Avoid
Avoid heat, flames, sparks and other sources of ignition. Containers may rupture or explode if exposed to heat. Keep out of water supplies and sewers.
Incompatible Materials
Acids, bases, oxidizing materials, combustible materials
Hazardous decomposition products
Oxides of carbon

Section 11 - TOXICOLOGICAL INFORMATION

Information on Likely Routes of Exposure
Inhalation
irritation (possibly severe), chest pain, difficulty breathing, emotional disturbances, headache, drowsiness, dizziness, loss of coordination, coma, cancer
Skin Contact
irritation
Eye Contact
irritation
Ingestion
nausea, vomiting, stomach pain, aspiration hazard
Acute and Chronic Toxicity
Component Analysis - LD50/LC50
The components of this material have been reviewed in various sources and the following selected endpoints are published:
ETHYL BENZENE (100-41-4)
Oral LD50 Rat 3500 mg/kg
Dermal LD50 Rabbit 15400 mg/kg
Inhalation LC50 Rat 17.4 mg/L 4 h
Product Toxicity Data
Acute Toxicity Estimate

Dermal	> 2000 mg/kg
Inhalation - Vapor	17.4 mg/L
Oral	> 2000 mg/kg

Immediate Effects
respiratory tract irritation, skin irritation, eye irritation, central nervous system damage, lung damage (from aspiration)
Delayed Effects
Reproductive Effects, cancer
Irritation/Corrosivity Data
respiratory tract irritation, skin irritation, eye irritation
Respiratory Sensitization
No data available.
Dermal Sensitization
No data available.
Component Carcinogenicity

ETHYL BENZENE	**100-41-4**
ACGIH:	A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
IARC:	Monograph 77 [2000] (Group 2B (possibly carcinogenic to humans))
DFG:	Category 4 (no significant contribution to human cancer)
OSHA:	Present

Germ Cell Mutagenicity
No data available.
Tumorigenic Data
No data available
Reproductive Toxicity
Available data characterizes components of this product as reproductive hazards.
Specific Target Organ Toxicity - Single Exposure
central nervous system, Respiratory system
Specific Target Organ Toxicity - Repeated Exposure
No target organs identified.
Aspiration hazard
This material is an aspiration hazard.
Medical Conditions Aggravated by Exposure
kidney disorders, liver disorders, respiratory disorders, skin disorders and allergies
Additional Data
May cross the placenta.

Section 12 - ECOLOGICAL INFORMATION

Ecotoxicity
Toxic to aquatic life.
Component Analysis - Aquatic Toxicity

ETHYL BENZENE	**100-41-4**
Fish:	LC50 96 h Oncorhynchus mykiss 11 - 18 mg/L [static]; LC50 96 h Oncorhynchus mykiss 4.2 mg/L [semi-static]; LC50 96 h Pimephales promelas 7.55 - 11 mg/L [flow-through]; LC50 96 h Lepomis macrochirus 32 mg/L [static]; LC50 96 h Pimephales promelas 9.1 - 15.6 mg/L [static]; LC50 96 h Poecilia reticulata 9.6 mg/L [static]
Algae:	EC50 72 h Pseudokirchneriella subcapitata 4.6 mg/L IUCLID ; EC50 96 h Pseudokirchneriella subcapitata >438 mg/L IUCLID ; EC50 72 h Pseudokirchneriella subcapitata 2.6 - 11.3 mg/L [static] EPA ; EC50 96 h Pseudokirchneriella subcapitata 1.7 - 7.6 mg/L [static] EPA
Invertebrate:	EC50 48 h Daphnia magna 1.8 - 2.4 mg/L IUCLID

Persistence and Degradability
Not expected to undergo hydrolysis in the environment.
Bioaccumulative Potential
Bioconcentration potential in aquatic organisms is low based on a BCF value of 15.
Mobility

Expected to have moderate mobility in soil.

Section 13 - DISPOSAL CONSIDERATIONS

Disposal Methods
Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262.
Hazardous Waste Number(s): D001.
Component Waste Numbers
The U.S. EPA has not published waste numbers for this product's components.

Section 14 - TRANSPORT INFORMATION

US DOT Information:
Shipping Name: ETHYLBENZENE
Hazard Class: 3
UN/NA #: UN1175
Packing Group: II
Required Label(s): 3
Marine pollutant

IMDG Information:
Shipping Name: ETHYLBENZENE
Hazard Class: 3
UN#: UN1175
Packing Group: II
Required Label(s): 3
Marine pollutant
International Bulk Chemical Code
This material contains one or more of the following chemicals required by the IBC Code to be identified as dangerous chemicals in bulk.

ETHYL BENZENE	**100-41-4**
IBC Code:	Category Y

Section 15 - REGULATORY INFORMATION

U.S. Federal Regulations
This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), CERCLA (40 CFR 302.4), TSCA 12(b), and/or require an OSHA process safety plan.

ETHYL BENZENE	**100-41-4**
SARA 313:	0.1 % de minimis concentration
CERCLA:	1000 lb final RQ ; 454 kg final RQ

SARA Section 311/312 (40 CFR 370 Subparts B and C) reporting categories
Flammable; Carcinogenicity; Acute toxicity; Reproductive Toxicity; Skin Corrosion/Irritation; Serious Eye Damage/Eye Irritation; Specific Target Organ Toxicity; Aspiration Hazard
U.S. State Regulations
The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA
ETHYL BENZENE	**100-41-4**	Yes	Yes	Yes	Yes	Yes

The following statement(s) are provided under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65):
WARNING! This product contains a chemical known to the state of California to cause cancer

ETHYL BENZENE	**100-41-4**
Carc:	carcinogen , 6/11/2004

Canada Regulations
Canadian WHMIS Ingredient Disclosure List (IDL)
Components of this material have been checked against the Canadian WHMIS Ingredients Disclosure List. The List is composed of chemicals which must be identified on MSDSs if they are included in products which meet WHMIS criteria specified in the Controlled Products Regulations and are present above the threshold limits listed on the IDL

ETHYL BENZENE	**100-41-4**
	0.1 %

WHMIS Classification
B2
Component Analysis - Inventory
ETHYL BENZENE (100-41-4)

US	CA	EU	AU	PH	JP - ENCS	JP - ISHL	KR KECI - Annex 1	KR KECI - Annex 2	KR - REACH CCA	CN	NZ	MX	TW	VN - NCI (Draft)
Yes	DSL	EIN	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes

Section 16 - OTHER INFORMATION

NFPA Ratings
Health: 2 Fire: 3 Reactivity: 0
Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe
Summary of Changes
Updated: 05/01/2015
Key / Legend
ACGIH - American Conference of Governmental Industrial Hygienists; ADR - European Road Transport; AU - Australia; BOD - Biochemical Oxygen Demand; C - Celsius; CA - Canada; CA/MA/MN/NJ/PA - California/Massachusetts/Minnesota/New Jersey/Pennsylvania*; CAS - Chemical Abstracts Service; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CFR - Code of Federal Regulations (US); CLP - Classification, Labelling, and Packaging; CN - China; CPR - Controlled Products Regulations; DFG - Deutsche Forschungsgemeinschaft; DOT - Department of Transportation; DSD - Dangerous Substance Directive; DSL - Domestic Substances List; EC – European Commission; EEC - European Economic Community; EIN - European Inventory of (Existing Commercial Chemical Substances); EINECS - European Inventory of Existing Commercial Chemical Substances; ENCS - Japan Existing and New Chemical Substance Inventory; EPA - Environmental Protection Agency; EU - European Union; F - Fahrenheit; IARC - International Agency for Research

on Cancer; IATA - International Air Transport Association; ICAO - International Civil Aviation Organization; IDL - Ingredient Disclosure List; IDLH - Immediately Dangerous to Life and Health; IMDG - International Maritime Dangerous Goods; ISHL - Japan Industrial Safety and Health Law; IUCLID - International Uniform Chemical Information Database; JP - Japan; Kow - Octanol/water partition coefficient; KR KECI Annex 1 - Korea Existing Chemicals Inventory (KECI) / Korea Existing Chemicals List (KECL); KR KECI Annex 2 - Korea Existing Chemicals Inventory (KECI) / Korea Existing Chemicals List (KECL) , KR - Korea; LD50/LC50 - Lethal Dose/ Lethal Concentration; LEL - Lower Explosive Limit; LLV - Level Limit Value; LOLI - List Of LIsts™ - ChemADVISOR's Regulatory Database; MAK - Maximum Concentration Value in the Workplace; MEL - Maximum Exposure Limits; MX – Mexico; NDSL – Non-Domestic Substance List (Canada); NFPA - National Fire Protection Agency; NIOSH - National Institute for Occupational Safety and Health; NJTSR - New Jersey Trade Secret Registry; NTP - National Toxicology Program; NZ - New Zealand; OSHA - Occupational Safety and Health Administration; PEL- Permissible Exposure Limit; PH - Philippines; RCRA - Resource Conservation and Recovery Act; REACH- Registration, Evaluation, Authorisation, and restriction of Chemicals; RID - European Rail Transport; SARA - Superfund Amendments and Reauthorization Act; STEL - Short-term Exposure Limit; TCCA – Korea Toxic Chemicals Control Act; TDG - Transportation of Dangerous Goods; TLV - Threshold Limit Value; TSCA - Toxic Substances Control Act; TW – Taiwan; TWA - Time Weighted Average; UEL - Upper Explosive Limit; UN/NA - United Nations /North American; US - United States; VLE - Exposure Limit Value (Mexico); VN NCI (Draft) - Vietnam National Chemicals Inventory (NCI) (Draft); WHMIS - Workplace Hazardous Materials Information System (Canada) .

Other Information

Disclaimer:

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Oxygen (0.0015-23.5%), Methane (0.0005-2.5%), Carbon Monoxide (0.001-0.09%), Hydrogen Sulfide (0.001-0.025%) in Nitrogen Balance

Safety Data Sheet 50018

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Date of issue: 03/12/2015 Revision date: 03/12/2015 Supersedes: 07/09/2014 Version: 1.1

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product form : Mixture

Product name : Oxygen (0.0015-23.5%), Methane (0.0005-2.5%), Carbon Monoxide (0.001-0.09%), Hydrogen Sulfide (0.001-0.025%) in Nitrogen Balance

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture : Test gas/Calibration gas.

1.3. Details of the supplier of the safety data sheet

Calgaz, division of Air Liquide
821 Chesapeake Drive
Cambridge, 21613 - USA
T 1-410-228-6400 - F 1-410-228-4251
info@Calgaz.com - www.Calgaz.com

1.4. Emergency telephone number

Emergency number : CHEMTREC: 1-800-424-9300
Internationally: 1-703-527-3887

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification (GHS-US)

Compressed gas H280

Full text of H-phrases: see section 16

2.2. Label elements

GHS-US labeling

Hazard pictograms (GHS-US) :

GHS04

Signal word (GHS-US) : Warning

Hazard statements (GHS-US) : H280 - Contains gas under pressure; may explode if heated

Precautionary statements (GHS-US) : P202 - Do not handle until all safety precautions have been read and understood
P271 - Use only outdoors or in a well-ventilated area
P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing
P313 - Get medical advice/attention
P403 - Store in a well-ventilated place
CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52°C (125°F)
CGA-PG05 - Use a back flow preventive device in the piping
CGA-PG06 - Close valve after each use and when empty
CGA-PG10 - Use only with equipment rated for cylinder pressure
CGA-PG14 - Approach suspected leak area with caution
CGA-PG21 - Open valve slowly

2.3. Other hazards

No additional information available

2.4. Unknown acute toxicity (GHS-US)

Not applicable

SECTION 3: Composition/information on ingredients

3.1. Substance

Not applicable

3.2. Mixture

Name	Product identifier	%	Classification (GHS-US)
Nitrogen	(CAS No) 7727-37-9	73.885 - 99.9965	Compressed gas, H280
Oxygen	(CAS No) 7782-44-7	0.0015 - 23.5	Ox. Gas 1, H270
Methane	(CAS No) 74-82-8	0.0005 - 2.5	Flam. Gas 1, H220 Compressed gas, H280
Carbon monoxide	(CAS No) 630-08-0	0.0005 - 0.09	Flam. Gas 1, H220 Compressed gas, H280 Acute Tox. 3 (Inhalation:gas), H331 Repr. 1A, H360 STOT RE 1, H372
Hydrogen sulfide	(CAS No) 7783-06-4	0.001 - 0.025	Flam. Gas 1, H220 Liquefied gas, H280 Acute Tox. 2 (Inhalation:gas), H330 STOT SE 3, H335 Aquatic Acute 1, H400

Full text of H-phrases: see section 16

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures after inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If you feel unwell, seek medical advice.

First-aid measures after skin contact : Adverse effects not expected from this product.

First-aid measures after eye contact : Adverse effects not expected from this product.

First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries after inhalation : May displace oxygen and cause rapid suffocation. Adverse effects not expected from this product.

Symptoms/injuries after skin contact : Adverse effects not expected from this product.

Symptoms/injuries after eye contact : Adverse effects not expected from this product.

Symptoms/injuries after ingestion : Ingestion is not considered a potential route of exposure.

Symptoms/injuries upon intravenous administration : Not known.

Chronic symptoms : Adverse effects not expected from this product.

4.3. Indication of any immediate medical attention and special treatment needed

If you feel unwell, seek medical advice. If breathing is difficult, give oxygen. Obtain medical attention if breathing difficulty persists.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Use extinguishing media appropriate for surrounding fire.

Unsuitable extinguishing media : Do not use water jet.

5.2. Special hazards arising from the substance or mixture

Fire hazard : The product is not flammable.

Explosion hazard : Heat may build pressure, rupturing closed containers, spreading fire and increasing risk of burns and injuries. Product is not explosive.

Reactivity : None known.

5.3. Advice for firefighters

Firefighting instructions : In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion. Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire.

Protection during firefighting : Do not enter fire area without proper protective equipment, including respiratory protection. Standard protective clothing and equipment (e.g., Self Contained Breathing Apparatus) for fire fighters.

Specific methods : Exposure to fire may cause containers to rupture/explode. Continue water spray from protected position until container stays cool. Move containers away from the fire area if this can be done without risk.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Ensure adequate ventilation.

6.1.1. For non-emergency personnel

Protective equipment : Wear protective equipment consistent with the site emergency plan.

Emergency procedures : Escape the danger area by the closest safe route. Close doors and windows of adjacent premises. Keep containers closed. Mark the danger area. Seal off low-lying areas. Keep upwind.

6.1.2. For emergency responders

Protective equipment : Standard protective clothing and equipment (e.g., Self Contained Breathing Apparatus) for fire fighters. Equip cleanup crew with proper protection.

Emergency procedures : Evacuate and limit access. Ventilate area.

6.2. Environmental precautions

Try to stop release if safe to do so. Stop leak if safe to do so.

6.3. Methods and material for containment and cleaning up

For containment : Try to stop release if safe to do so. Stop leak if safe to do so.

Methods for cleaning up : Dispose of this material and its container in accordance with local regulations.

6.4. Reference to other sections

See also Sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Additional hazards when processed : Pressurized container: Do not pierce or burn, even after use. Use equipment rated for cylinder pressure.

Precautions for safe handling : Do not handle until all safety precautions have been read and understood. Use only outdoors or in a well-ventilated area.

Safe handling of the gas receptacle : Protect cylinders from physical damage; do not drag, roll, slide or drop. Do not remove or deface labels provided by the supplier for the identification of the cylinder contents.

Safe use of the product : The substance must be handled in accordance with good industrial hygiene and safety procedures. Only experienced and properly instructed persons should handle gases under pressure. Consider pressure relief device(s) in gas installations. Ensure the complete gas system was (or is regularily) checked for leaks before use. Do not remove or deface labels provided by the supplier for the identification of the cylinder contents.

Hygiene measures : Do not eat, drink or smoke when using this product.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures : Comply with applicable regulations.

Storage conditions : Do not expose to temperatures exceeding 52°C (125°F). Keep container closed when not in use. Protect cylinder from physical damage. Store in well ventilated area. Store locked up.

Incompatible products : None known.

Incompatible materials : None known. Flammable materials.

Storage area : Store away from heat. Store in a well-ventilated place.

7.3. Specific end use(s)

See Section 1.2.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Oxygen (0.0015-23.5%), Methane (0.0005-2.5%), Carbon Monoxide (0.001-0.09%), Hydrogen Sulfide (0.001-0.025%) in Nitrogen Balance	
ACGIH	Not applicable
OSHA	Not applicable

Nitrogen (7727-37-9)	
ACGIH	Not applicable
OSHA	Not applicable

Methane (74-82-8)		
ACGIH	ACGIH TWA (ppm)	1000 ppm
OSHA	Not applicable	

Hydrogen sulfide (7783-06-4)		
ACGIH	ACGIH TWA (ppm)	1 ppm
ACGIH	ACGIH STEL (ppm)	5 ppm
OSHA	OSHA PEL (Ceiling) (ppm)	20 ppm

Oxygen (7782-44-7)	
ACGIH	Not applicable
OSHA	Not applicable

Carbon monoxide (630-08-0)		
ACGIH	ACGIH TWA (ppm)	25 ppm
OSHA	OSHA PEL (TWA) (mg/m³)	55 mg/m³
OSHA	OSHA PEL (TWA) (ppm)	50 ppm

8.2. Exposure controls

Appropriate engineering controls : Provide adequate general and local exhaust ventilation. Systems under pressure should be regularly checked for leakages. Consider work permit system e.g. for maintenance activities. Ensure exposure is below occupational exposure limits.

Hand protection : Wear working gloves when handling gas containers. 29 CFR 1910.138: Hand Protection.

Eye protection : Wear safety glasses with side shields. 29 CFR 1910.133: Eye and Face Protection.

Skin and body protection : Wear suitable protective clothing, e.g. - lab coats, coveralls or flame resistant clothing.

Respiratory protection : None necessary during normal and routine operations. See Sections 5 & 6.

Thermal hazard protection : None necessary during normal and routine operations.

Environmental exposure controls : Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

Other information : Wear safety shoes while handling containers. 29 CFR 1910.136: Foot Protection.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Gas

Appearance : Clear, colorless gas.

Molecular mass : Not applicable for gas-mixtures.

Color : Colorless

Odor : Odorless

Odor threshold : No data available

pH : Not applicable for gas-mixtures.

Relative evaporation rate (butyl acetate=1) : No data available

Relative evaporation rate (ether=1) : Not applicable for gas-mixtures.

Melting point : No data available

Freezing point : No data available

Boiling point : No data available

Flash point : No data available

Auto-ignition temperature : No data available

Decomposition temperature : No data available

Flammability (solid, gas) : See Sect. 2.1 & 2.2

Vapor pressure : Not applicable.

Relative vapor density at 20 °C : No data available

Relative density : No data available

Relative gas density	:	Heavier than air.
Solubility	:	Water: Solubility in water of component(s) of the mixture : • : 20 mg/l • : 26 mg/l • : 3980 mg/l • : 39 mg/l • : Insoluble
Log Pow	:	Not applicable for gas-mixtures.
Log Kow	:	Not applicable for gas-mixtures.
Viscosity, kinematic	:	Not applicable.
Viscosity, dynamic	:	Not applicable.
Explosive properties	:	Not applicable - not flammable.
Oxidizing properties	:	Not combustible but enhances combustion of other substances. Supports combustion. None.
Explosive limits	:	Not applicable - not flammable

9.2. Other information

Additional information : Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

SECTION 10: Stability and reactivity

10.1. Reactivity

None known.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

None known. Can form explosive mixtures with flammable materials.

10.4. Conditions to avoid

None under recommended storage and handling conditions (see section 7).

10.5. Incompatible materials

None known.

10.6. Hazardous decomposition products

Under normal conditions of storage and use hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Not classified

Nitrogen (7727-37-9)	
LC50 inhalation rat (ppm)	820000 ppm/4h

Methane (74-82-8)	
LC50 inhalation rat (ppm)	820000 ppm/4h

Hydrogen sulfide (7783-06-4)	
LC50 inhalation rat (mg/l)	0.99 mg/l (Exposure time: 1 h)
LC50 inhalation rat (ppm)	356 ppm/4h
ATE US (gases)	100.000 ppmV/4h

Oxygen (7782-44-7)	
LC50 inhalation rat (ppm)	800000 ppm/4h

Carbon monoxide (630-08-0)	
LC50 inhalation rat (ppm)	1880 ppm/4h
ATE US (gases)	1880.000 ppmV/4h

Skin corrosion/irritation : Not classified
pH: Not applicable for gas-mixtures.

Serious eye damage/irritation : Not classified
pH: Not applicable for gas-mixtures.

Respiratory or skin sensitization : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity	:	Not classified
Reproductive toxicity	:	Not classified
Specific target organ toxicity (single exposure)	:	Not classified
Specific target organ toxicity (repeated exposure)	:	Not classified
Aspiration hazard	:	Not classified
Symptoms/injuries after inhalation	:	May displace oxygen and cause rapid suffocation. Adverse effects not expected from this product.
Symptoms/injuries after skin contact	:	Adverse effects not expected from this product.
Symptoms/injuries after eye contact	:	Adverse effects not expected from this product.
Symptoms/injuries after ingestion	:	Ingestion is not considered a potential route of exposure.
Symptoms/injuries upon intravenous administration	:	Not known.
Chronic symptoms	:	Adverse effects not expected from this product.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : No ecological damage caused by this product.

Hydrogen sulfide (7783-06-4)	
LC50 fish 1	0.0448 mg/l (Exposure time: 96 h - Species: Lepomis macrochirus [flow-through])
EC50 Daphnia 1	0.022 mg/l (Exposure time: 96 h - Species: Gammarus pseudolimnaeus)
LC50 fish 2	0.016 mg/l (Exposure time: 96 h - Species: Pimephales promelas [flow-through])

12.2. Persistence and degradability

Oxygen (0.0015-23.5%), Methane (0.0005-2.5%), Carbon Monoxide (0.001-0.09%), Hydrogen Sulfide (0.001-0.025%) in Nitrogen Balance	
Persistence and degradability	No data available.

Nitrogen (7727-37-9)	
Persistence and degradability	No ecological damage caused by this product.

Methane (74-82-8)	
Persistence and degradability	The substance is biodegradable. Unlikely to persist. No data available.

Hydrogen sulfide (7783-06-4)	
Persistence and degradability	Not applicable for inorganic gases.

Oxygen (7782-44-7)	
Persistence and degradability	No ecological damage caused by this product.

Carbon monoxide (630-08-0)	
Persistence and degradability	Will not undergo hydrolysis. Not readily biodegradable. Not applicable for inorganic gases.

12.3. Bioaccumulative potential

Oxygen (0.0015-23.5%), Methane (0.0005-2.5%), Carbon Monoxide (0.001-0.09%), Hydrogen Sulfide (0.001-0.025%) in Nitrogen Balance	
Log Pow	Not applicable for gas-mixtures.
Log Kow	Not applicable for gas-mixtures.
Bioaccumulative potential	No data available.

Nitrogen (7727-37-9)	
Log Pow	Not applicable for inorganic gases.
Bioaccumulative potential	No ecological damage caused by this product.

Methane (74-82-8)	
Log Pow	Not applicable for gas mixtures
Log Kow	Not applicable for gas mixtures
Bioaccumulative potential	Not expected to bioaccumulate due to the low log Kow (log Kow < 4). Refer to section 9.

Hydrogen sulfide (7783-06-4)	
BCF fish 1	(no bioaccumulation expected)
Log Pow	Not applicable for inorganic gases.
Bioaccumulative potential	No data available.

Oxygen (7782-44-7)	
Log Pow	Not applicable for inorganic gases.
Bioaccumulative potential	No ecological damage caused by this product.

Carbon monoxide (630-08-0)	
Log Pow	1.78
Bioaccumulative potential	Not expected to bioaccumulate due to the low log Kow (log Kow < 4). Refer to section 9.

12.4. Mobility in soil

Oxygen (0.0015-23.5%), Methane (0.0005-2.5%), Carbon Monoxide (0.001-0.09%), Hydrogen Sulfide (0.001-0.025%) in Nitrogen Balance	
Mobility in soil	No data available.

Nitrogen (7727-37-9)	
Ecology - soil	No ecological damage caused by this product.

Methane (74-82-8)	
Mobility in soil	No data available.
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.

Hydrogen sulfide (7783-06-4)	
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.

Oxygen (7782-44-7)	
Ecology - soil	No ecological damage caused by this product.

Carbon monoxide (630-08-0)	
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.

12.5. Other adverse effects

Effect on ozone layer : None.

Effect on the global warming : Contains greenhouse gas(es) not covered by 842/2006/EC.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste treatment methods : Contact supplier if guidance is required. Do not discharge into any place where its accumulation could be dangerous. Ensure that the emission levels from local regulations or operating permits are not exceeded.

Waste disposal recommendations : Refer to the CGA Pamphlet P-63 "Disposal of Gases" available at www.cganet.com for more guidance on suitable disposal methods.

SECTION 14: Transport information

In accordance with DOT

Transport document description : UN1956 Compressed gas, n.o.s. (Nitrogen, Oxygen), 2.2

UN-No.(DOT) : UN1956

Proper Shipping Name (DOT) : Compressed gas, n.o.s.

Department of Transportation (DOT) Hazard Classes : 2.2 - Class 2.2 - Non-flammable compressed gas 49 CFR 173.115

Hazard labels (DOT) : 2.2 - Non-flammable gas

DOT Symbols : G - Identifies PSN requiring a technical name

DOT Packaging Exceptions (49 CFR 173.xxx) : 306;307

DOT Packaging Non Bulk (49 CFR 173.xxx) : 302;305

DOT Packaging Bulk (49 CFR 173.xxx)	:	314;315
DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27)	:	75 kg
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75)	:	150 kg
DOT Vessel Stowage Location	:	A - The material may be stowed ''on deck'' or ''under deck'' on a cargo vessel and on a passenger vessel.

Additional information

Other information	:	No supplementary information available.
Special transport precautions	:	Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers: - Ensure there is adequate ventilation. - Ensure that containers are firmly secured. - Ensure cylinder valve is closed and not leaking. - Ensure valve outlet cap nut or plug (where provided) is correctly fitted. - Ensure valve protection device (where provided) is correctly fitted.

ADR

Transport document description	:	UN 1956 COMPRESSED GAS, N.O.S., 2.2
Class (ADR)	:	2 - Gases
Hazard labels (ADR)	:	2.2 - Non-flammable compressed gas

Transport by sea

UN-No. (IMDG)	:	1956
Proper Shipping Name (IMDG)	:	COMPRESSED GAS, N.O.S.
Class (IMDG)	:	2.2 - Non-flammable, non-toxic gases

Air transport

UN-No.(IATA)	:	1956
Proper Shipping Name (IATA)	:	COMPRESSED GAS, N.O.S.
Class (IATA)	:	2

SECTION 15: Regulatory information

15.1. US Federal regulations

Nitrogen (7727-37-9)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	

Methane (74-82-8)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	

Hydrogen sulfide (7783-06-4)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory Listed on the United States SARA Section 302 Listed on United States SARA Section 313	
SARA Section 302 Threshold Planning Quantity (TPQ)	500
SARA Section 313 - Emission Reporting	1.0 %

Oxygen (7782-44-7)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	

Carbon monoxide (630-08-0)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	

15.2. International regulations

CANADA

Nitrogen (7727-37-9)	
Listed on the Canadian DSL (Domestic Sustances List)	
WHMIS Classification	Class A - Compressed Gas

Methane (74-82-8)	
Listed on the Canadian DSL (Domestic Sustances List)	
WHMIS Classification	Class A - Compressed Gas Class B Division 1 - Flammable Gas

Hydrogen sulfide (7783-06-4)	
Listed on the Canadian DSL (Domestic Sustances List)	
WHMIS Classification	Class A - Compressed Gas Class B Division 1 - Flammable Gas Class D Division 1 Subdivision A - Very toxic material causing immediate and serious toxic effects Class D Division 2 Subdivision B - Toxic material causing other toxic effects

Oxygen (7782-44-7)	
Listed on the Canadian DSL (Domestic Sustances List)	
WHMIS Classification	Class A - Compressed Gas Class C - Oxidizing Material

Carbon monoxide (630-08-0)	
Listed on the Canadian DSL (Domestic Sustances List)	
WHMIS Classification	Class A - Compressed Gas Class B Division 1 - Flammable Gas Class D Division 1 Subdivision A - Very toxic material causing immediate and serious toxic effects Class D Division 2 Subdivision A - Very toxic material causing other toxic effects

EU-Regulations

Nitrogen (7727-37-9)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

Methane (74-82-8)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

Hydrogen sulfide (7783-06-4)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

Oxygen (7782-44-7)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

Carbon monoxide (630-08-0)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

Classification according to Regulation (EC) No. 1272/2008 [CLP]
Not classified

Classification according to Directive 67/548/EEC [DSD] or 1999/45/EC [DPD]

15.2.2. National regulations

Nitrogen (7727-37-9)
Listed on the AICS (Australian Inventory of Chemical Substances) Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China) Listed on the Korean ECL (Existing Chemicals List) Listed on NZIoC (New Zealand Inventory of Chemicals) Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)

Methane (74-82-8)
Listed on the AICS (Australian Inventory of Chemical Substances) Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China) Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory Listed on the Korean ECL (Existing Chemicals List) Listed on NZIoC (New Zealand Inventory of Chemicals) Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)

Hydrogen sulfide (7783-06-4)
Listed on the AICS (Australian Inventory of Chemical Substances) Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China) Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory Listed on the Korean ECL (Existing Chemicals List) Listed on NZIoC (New Zealand Inventory of Chemicals) Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances) Listed on the Canadian IDL (Ingredient Disclosure List)

Oxygen (7782-44-7)
Listed on the AICS (Australian Inventory of Chemical Substances) Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China) Listed on the Korean ECL (Existing Chemicals List) Listed on NZIoC (New Zealand Inventory of Chemicals) Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)

Carbon monoxide (630-08-0)
Listed on the AICS (Australian Inventory of Chemical Substances) Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China) Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory Listed on the Korean ECL (Existing Chemicals List) Listed on NZIoC (New Zealand Inventory of Chemicals) Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances) Listed on the Canadian IDL (Ingredient Disclosure List)

15.3. US State regulations

Carbon monoxide (630-08-0)				
U.S. - California - Proposition 65 - Carcinogens List	U.S. - California - Proposition 65 - Developmental Toxicity	U.S. - California - Proposition 65 - Reproductive Toxicity - Female	U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No significance risk level (NSRL)
No	Yes	No	No	

Nitrogen (7727-37-9)
U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List

Methane (74-82-8)
U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List

Hydrogen sulfide (7783-06-4)
U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List U.S. - Pennsylvania - RTK (Right to Know) List

Oxygen (7782-44-7)
U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List

Carbon monoxide (630-08-0)
U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List U.S. - Pennsylvania - RTK (Right to Know) List

SECTION 16: Other information

Indication of changes : Revised safety data sheet in accordance with OSHA final rule on GHS implementation promulgated March 26, 2012.

Revision date	:	03/12/2015
Other information	:	This Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this product.

Full text of H-phrases:

Acute Tox. 2 (Inhalation:gas)	Acute toxicity (inhalation:gas) Category 2
Acute Tox. 3 (Inhalation:gas)	Acute toxicity (inhalation:gas) Category 3
Aquatic Acute 1	Hazardous to the aquatic environment - Acute Hazard Category 1
Compressed gas	Gases under pressure Compressed gas
Flam. Gas 1	Flammable gases Category 1
Liquefied gas	Gases under pressure Liquefied gas
Ox. Gas 1	Oxidizing gases Category 1
Repr. 1A	Reproductive toxicity Category 1A
STOT RE 1	Specific target organ toxicity (repeated exposure) Category 1
STOT SE 3	Specific target organ toxicity (single exposure) Category 3
H220	Extremely flammable gas
H270	May cause or intensify fire; oxidizer
H280	Contains gas under pressure; may explode if heated
H330	Fatal if inhaled
H331	Toxic if inhaled
H335	May cause respiratory irritation
H360	May damage fertility or the unborn child
H372	Causes damage to organs through prolonged or repeated exposure
H400	Very toxic to aquatic life

SDS US (GHS HazCom 2012)

This Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this gas mixture. To the best of Calgaz's knowledge, the information contained herein is reliable and accurate as of this date; however, accruacy, suitability or completeness are not guaranteed and no warranties of any type, either express or implied, are provided. The information contained herein relates only to this specific product. If this gas mixture is combined with other materials, all component properties must be considered. Data may be changed from time to time. Be sure to consult the latest edition.

SAFETY DATA SHEET

Helium

Section 1. Identification

GHS product identifier : Helium

Chemical name : Helium

Other means of identification : helium (dot); Helium-4; He; o-Helium; UN 1046

Product use : Synthetic/Analytical chemistry.

Synonym : helium (dot); Helium-4; He; o-Helium; UN 1046

SDS # : 001025

Supplier's details : Airgas USA, LLC and its affiliates
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253

Emergency telephone number (with hours of operation) : 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : GASES UNDER PRESSURE - Compressed gas

GHS label elements

Hazard pictograms :

Signal word : Warning

Hazard statements : Contains gas under pressure; may explode if heated.
May displace oxygen and cause rapid suffocation.

Precautionary statements

General : Read and follow all Safety Data Sheets (SDS'S) before use. Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Use a back flow preventative device in the piping. Use only equipment of compatible materials of construction.

Prevention : Use and store only outdoors or in a well ventilated place.

Response : Not applicable.

Storage : Protect from sunlight. Protect from sunlight when ambient temperature exceeds 52°C/125°F. Store in a well-ventilated place.

Disposal : Not applicable.

Hazards not otherwise classified : In addition to any other important health or physical hazards, this product may displace oxygen and cause rapid suffocation.

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Section 3. Composition/information on ingredients

Substance/mixture : Substance

Chemical name : Helium

Other means of identification : helium (dot); Helium-4; He; o-Helium; UN 1046

CAS number/other identifiers

CAS number : 7440-59-7

Product code : 001025

Ingredient name	%	CAS number
Helium	100	7440-59-7

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : As this product is a gas, refer to the inhalation section.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Contact with rapidly expanding gas may cause burns or frostbite.

Inhalation : No known significant effects or critical hazards.

Skin contact : Contact with rapidly expanding gas may cause burns or frostbite.

Frostbite : Try to warm up the frozen tissues and seek medical attention.

Ingestion : As this product is a gas, refer to the inhalation section.

Over-exposure signs/symptoms

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

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Section 4. First aid measures

Specific treatments : No specific treatment.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode.

Hazardous thermal decomposition products : No specific data.

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Immediately contact emergency personnel. Stop leak if without risk.

Large spill : Immediately contact emergency personnel. Stop leak if without risk. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

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Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Avoid contact with eyes, skin and clothing. Avoid breathing gas. Empty containers retain product residue and can be hazardous. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Keep container tightly closed and sealed until ready for use. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Helium	Oxygen Depletion [Asphyxiant]

Appropriate engineering controls : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

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Section 8. Exposure controls/personal protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state : Gas. [Compressed gas.]

Color : Colorless.

Molecular weight : 4 g/mole

Molecular formula : He

Boiling/condensation point : -268.9°C (-452°F)

Melting/freezing point : -272.2°C (-458°F)

Critical temperature : -267.9°C (-450.2°F)

Odor : Odorless.

Odor threshold : Not available.

pH : Not available.

Flash point : [Product does not sustain combustion.]

Burning time : Not applicable.

Burning rate : Not applicable.

Evaporation rate : Not available.

Flammability (solid, gas) : Not available.

Lower and upper explosive (flammable) limits : Not available.

Vapor pressure : Not available.

Vapor density : 0.14 (Air = 1) Liquid Density@BP: 7.8 lb/ft3 (125 kg/m3)

Specific Volume (ft^3/lb) : 96.1538

Gas Density (lb/ft^3) : 0.0104

Relative density : Not applicable.

Solubility : Not available.

Solubility in water : Not available.

Partition coefficient: n-octanol/water : 0.28

Auto-ignition temperature : Not available.

Decomposition temperature : Not available.

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Section 9. Physical and chemical properties

SADT : Not available.

Viscosity : Not applicable.

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : No specific data.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Not available.

Irritation/Corrosion

Not available.

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

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Section 11. Toxicological information

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : Contact with rapidly expanding gas may cause burns or frostbite.

Inhalation : No known significant effects or critical hazards.

Skin contact : Contact with rapidly expanding gas may cause burns or frostbite.

Ingestion : As this product is a gas, refer to the inhalation section.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

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Section 12. Ecological information

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Helium	0.28	-	low

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Empty Airgas-owned pressure vessels should be returned to Airgas. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN1046	UN1046	UN1046	UN1046	UN1046
UN proper shipping name	HELIUM, COMPRESSED	HELIUM, COMPRESSED	HELIUM, COMPRESSED	HELIUM, COMPRESSED	HELIUM, COMPRESSED
Transport hazard class(es)	2.2	2.2	2.2	2.2	2.2
Packing group	-	-	-	-	-
Environment	No.	No.	No.	No.	No.
Additional information	**Limited quantity** Yes. **Packaging instruction** **Passenger aircraft** Quantity limitation: 75 kg **Cargo aircraft** Quantity limitation: 150 kg	**Explosive Limit and Limited Quantity Index** 0.125 **Passenger Carrying Road or Rail Index** 75	-	-	**Passenger and Cargo Aircraft**Quantity limitation: 75 kg **Cargo Aircraft Only** Quantity limitation: 150 kg

"Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product."

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Section 14. Transport information

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption**: Not determined

United States inventory (TSCA 8b): This material is listed or exempted.

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Sudden release of pressure

Composition/information on ingredients

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
Helium	100	No.	Yes.	No.	No.	No.

State regulations

Massachusetts : This material is listed.

New York : This material is not listed.

New Jersey : This material is listed.

Pennsylvania : This material is listed.

Canada inventory : This material is listed or exempted.

International regulations

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Section 15. Regulatory information

International lists : **Australia inventory (AICS)**: This material is listed or exempted.
China inventory (IECSC): This material is listed or exempted.
Japan inventory: Not determined.
Korea inventory: This material is listed or exempted.
Malaysia Inventory (EHS Register): Not determined.
New Zealand Inventory of Chemicals (NZIoC): This material is listed or exempted.
Philippines inventory (PICCS): This material is listed or exempted.
Taiwan inventory (CSNN): Not determined.

Chemical Weapons Convention List Schedule I Chemicals : Not listed

Chemical Weapons Convention List Schedule II Chemicals : Not listed

Chemical Weapons Convention List Schedule III Chemicals : Not listed

Canada

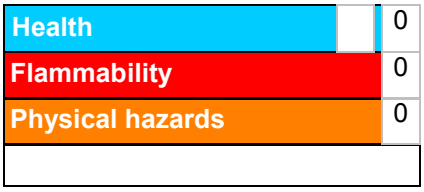
WHMIS (Canada) : Class A: Compressed gas.

CEPA Toxic substances: This material is not listed.
Canadian ARET: This material is not listed.
Canadian NPRI: This material is not listed.
Alberta Designated Substances: This material is not listed.
Ontario Designated Substances: This material is not listed.
Quebec Designated Substances: This material is not listed.

Section 16. Other information

Canada Label requirements : Class A: Compressed gas.

Hazardous Material Information System (U.S.A.)



Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on SDSs under 29 CFR 1910. 1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)

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Section 16. Other information

Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

History

Date of printing : 10/15/2014.

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Version : 0.02

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United NationsACGIH – American Conference of Governmental Industrial Hygienists
AIHA – American Industrial Hygiene Association
CAS – Chemical Abstract Services
CEPA – Canadian Environmental Protection Act
CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act (EPA)
CFR – United States Code of Federal Regulations
CPR – Controlled Products Regulations
DSL – Domestic Substances List
GWP – Global Warming Potential
IARC – International Agency for Research on Cancer
ICAO – International Civil Aviation Organisation
Inh – Inhalation
LC – Lethal concentration
LD – Lethal dosage
NDSL – Non-Domestic Substances List
NIOSH – National Institute for Occupational Safety and Health
TDG – Canadian Transportation of Dangerous Goods Act and Regulations
TLV – Threshold Limit Value
TSCA – Toxic Substances Control Act
WEEL – Workplace Environmental Exposure Level
WHMIS – Canadian Workplace Hazardous Material Information System

References : Not available.

Indicates information that has changed from previously issued version.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

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SAFETY DATA SHEET

Version 6.7
Revision Date 08/06/2024
Print Date 08/07/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Potassium hydrogen phthalate

Product Number : P1088
Brand : Sigma-Aldrich
CAS-No. : 877-24-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture.

2.2 GHS Label elements, including precautionary statements

No hazard pictogram, no signal word, no hazard statement(s), no precautionary statement(s) required.

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2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	KHP Potassium biphthalate Potassium phthalate monobasic Phthalic acidmonopotassium salt Potassium hydrogen phthalate
Formula	:	$C_8H_5KO_4$
Molecular weight	:	204.22 g/mol
CAS-No.	:	877-24-7
EC-No.	:	212-889-4

No components need to be disclosed according to the applicable regulations.

SECTION 4: First aid measures

4.1 Description of first-aid measures
No data available

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media
No data available

5.2 Special hazards arising from the substance or mixture
Carbon oxides
Potassium oxides
Combustible.

5.3 Advice for firefighters
No data available

5.4 Further information
No data available

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SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
For personal protection see section 8.

6.2 Environmental precautions
No data available

6.3 Methods and materials for containment and cleaning up
No data available

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
No data available

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Personal protective equipment

Skin protection
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please

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contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

Control of environmental exposure
Prevent product from entering drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: Crystalline solid Color: white
b)	Odor	No data available
c)	Odor Threshold	No data available
d)	pH	4 at 25 °C (77 °F)
e)	Melting point/freezing point	Melting point/ range: 295 - 300 °C (563 - 572 °F) - dec.
f)	Initial boiling point and boiling range	> 300 °C > 572 °F at 977.5 hPa - OECD Test Guideline 103
g)	Flash point	197.3 °C (387.1 °F) - Pensky-Martens closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	The product is not flammable. - Regulation (EC) No. 440/2008, Annex, A.10
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Density	1.571 g/cm3 at 20 °C (68 °F)
	Relative density	No data available
n)	Water solubility	93 g/l at 30 °C (86 °F) - OECD Test Guideline 105
o)	Partition coefficient: n-octanol/water	log Pow: <= -3.9 at 30 °C (86 °F) - Bioaccumulation is not expected.
p)	Autoignition temperature	does not ignite
q)	Decomposition temperature	No data available
r)	Viscosity	No data available

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s) Explosive properties No data available

t) Oxidizing properties none

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
No data available

10.3 Possibility of hazardous reactions
Violent reactions possible with:
Strong oxidizing agents
Nitric acid

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
Acute toxicity estimate Oral - 2,500 mg/kg
(Calculation method)
LD50 Oral - Rat - > 3,200 mg/kg
Remarks: (ECHA)
Inhalation: No data available
Dermal: No data available

Skin corrosion/irritation
Remarks: slight irritation

Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation
Remarks: The value is given based on a SAR/AAR approach using OECD Toolbox, DEREK, VEGA QSAR models (CAESAR models), etc.
(ECHA)

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Respiratory or skin sensitization
In vitro study
Result: negative
(OECD Test Guideline 442D)

Germ cell mutagenicity
Test Type: Ames test
Test system: S. typhimurium
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

RTECS: CZ4326000
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Hazardous properties cannot be excluded but are unlikely when the product is handled appropriately.

Handle in accordance with good industrial hygiene and safety practice.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	static test LC50 - Danio rerio (zebra fish) - > 100 mg/l - 96 h (OECD Test Guideline 203)
Toxicity to algae	static test ErC50 - Desmodesmus subspicatus (green algae) - 329.5 mg/l - 72 h (OECD Test Guideline 201)

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Toxicity to bacteria	Remarks: (ECHA) (potassium hydrogen phthalate)

12.2 Persistence and degradability

Biodegradability	Result: 97.34 % - Readily biodegradable. (OECD Test Guideline 301D)

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties

No data available

12.7 Other adverse effects

Discharge into the environment must be avoided.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

No data available

SECTION 14: Transport information

DOT (US)

Not dangerous goods

IMDG

Not dangerous goods

IATA

Not dangerous goods

Further information

Not classified as dangerous in the meaning of transport regulations.

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SECTION 15: Regulatory information

CERCLA Reportable Quantity

This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : No SARA Hazards

SARA 313 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

US State Regulations

Massachusetts Right To Know

No components are subject to the Massachusetts Right to Know Act.

Maine Chemicals of High Concern

Product does not contain any listed chemicals

Vermont Chemicals of High Concern

Product does not contain any listed chemicals

Washington Chemicals of High Concern

Product does not contain any listed chemicals

The ingredients of this product are reported in the following inventories:

TSCA : All substances listed as active on the TSCA inventory

TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16: Other information

The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 6.7 Revision Date: 08/06/2024 Print Date: 08/07/2024

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SAFETY DATA SHEET

Nonflammable Gas Mixture: Carbon Dioxide / Nitrogen / Oxygen

Airgas
an Air Liquide company

Section 1. Identification

GHS product identifier : Nonflammable Gas Mixture: Carbon Dioxide / Nitrogen / Oxygen

Other means of identification : Not available.

Product type : Gas.

Product use : Synthetic/Analytical chemistry.

SDS # : 002061

Supplier's details : Airgas USA, LLC and its affiliates
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253

24-hour telephone : 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : GASES UNDER PRESSURE - Compressed gas

GHS label elements

Hazard pictograms :

Signal word : Warning

Hazard statements : Contains gas under pressure; may explode if heated.
May displace oxygen and cause rapid suffocation.
May increase respiration and heart rate.

Precautionary statements

General : Read and follow all Safety Data Sheets (SDS'S) before use. Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Use a back flow preventative device in the piping. Use only equipment of compatible materials of construction.

Prevention : Not applicable.

Response : Not applicable.

Storage : Protect from sunlight. Store in a well-ventilated place.

Disposal : Not applicable.

Hazards not otherwise classified : In addition to any other important health or physical hazards, this product may displace oxygen and cause rapid suffocation.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

Other means of identification : Not available.

Product code : 002061

Ingredient name	%	CAS number
Carbon Dioxide	2 - 99	124-38-9
Nitrogen	0.0001 - 98	7727-37-9
oxygen	0.0001 - 19.5	7782-44-7

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : As this product is a gas, refer to the inhalation section.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Contact with rapidly expanding gas may cause burns or frostbite.

Inhalation : No known significant effects or critical hazards.

Skin contact : Contact with rapidly expanding gas may cause burns or frostbite.

Frostbite : Try to warm up the frozen tissues and seek medical attention.

Ingestion : As this product is a gas, refer to the inhalation section.

Over-exposure signs/symptoms

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Specific treatments : No specific treatment.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

Section 4. First aid measures

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
nitrogen oxides

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Immediately contact emergency personnel. Stop leak if without risk.

Large spill : Immediately contact emergency personnel. Stop leak if without risk. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Avoid breathing gas. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.
Avoid contact with eyes, skin and clothing. Empty containers retain product residue and can be hazardous.

Section 7. Handling and storage

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F). Keep container tightly closed and sealed until ready for use. See Section 10 for incompatible materials before handling or use.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Carbon Dioxide	**ACGIH TLV (United States, 3/2019). Oxygen Depletion [Asphyxiant].** STEL: 54000 mg/m³ 15 minutes. STEL: 30000 ppm 15 minutes. TWA: 9000 mg/m³ 8 hours. TWA: 5000 ppm 8 hours. **NIOSH REL (United States, 10/2016).** STEL: 54000 mg/m³ 15 minutes. STEL: 30000 ppm 15 minutes. TWA: 9000 mg/m³ 10 hours. TWA: 5000 ppm 10 hours. **OSHA PEL (United States, 5/2018).** TWA: 9000 mg/m³ 8 hours. TWA: 5000 ppm 8 hours. **OSHA PEL 1989 (United States, 3/1989).** STEL: 54000 mg/m³ 15 minutes. STEL: 30000 ppm 15 minutes. TWA: 18000 mg/m³ 8 hours. TWA: 10000 ppm 8 hours.
Nitrogen	**ACGIH TLV (United States, 3/2019). Oxygen Depletion [Asphyxiant].**
oxygen	None.

Appropriate engineering controls : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Section 8. Exposure controls/personal protection

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state : Gas.

Color : Not available.

Odor : Not available.

Odor threshold : Not available.

pH : Not available.

Melting point : -210.01°C (-346°F) This is based on data for the following ingredient: nitrogen. Weighted average: -211.4°C (-348.5°F)

Boiling point : Not available.

Critical temperature : Lowest known value: -146.95°C (-232.5°F) (nitrogen).

Flash point : Not available.

Evaporation rate : Not available.

Flammability (solid, gas) : Not available.

Lower and upper explosive (flammable) limits : Not available.

Vapor pressure : Not available.

Vapor density : Highest known value: 1.5 (Air = 1) (Carbon dioxide). Weighted average: 1.23 (Air = 1)

Gas Density (lb/ft ^{3}) : Weighted average: 0.09

Relative density : Not applicable.

Solubility : Not available.

Solubility in water : Not available.

Partition coefficient: n-octanol/water : Not available.

Auto-ignition temperature : Not available.

Decomposition temperature : Not available.

Viscosity : Not applicable.

Flow time (ISO 2431) : Not available.

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : No specific data.

Incompatible materials : No specific data.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Not available.

Irritation/Corrosion

Not available.

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : Contact with rapidly expanding gas may cause burns or frostbite.

Inhalation : No known significant effects or critical hazards.

Skin contact : Contact with rapidly expanding gas may cause burns or frostbite.

Section 11. Toxicological information

Ingestion : As this product is a gas, refer to the inhalation section.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Carbon Dioxide	0.83	-	low
Nitrogen	0.67	-	low
oxygen	0.65	-	low

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Section 12. Ecological information

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Empty Airgas-owned pressure vessels should be returned to Airgas. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN1956	UN1956	UN1956	UN1956	UN1956
UN proper shipping name	COMPRESSED GAS, N.O.S. (nitrogen, oxygen)	COMPRESSED GAS, N.O.S. (nitrogen, oxygen)	COMPRESSED GAS, N.O.S. (nitrogen, oxygen)	COMPRESSED GAS, N.O.S. (nitrogen, oxygen)	COMPRESSED GAS, N.O.S. (nitrogen, oxygen)
Transport hazard class(es)	2.2	2.2	2.2	2.2	2.2
Packing group	-	-	-	-	-
Environmental hazards	No.	No.	No.	No.	No.

"Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product."

Additional information

TDG Classification : Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.13-2.17 (Class 2).
Explosive Limit and Limited Quantity Index 0.125
Passenger Carrying Road or Rail Index 75

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to IMO instruments : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption**: All components are listed or exempted.

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Section 15. Regulatory information

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Refer to Section 2: Hazards Identification of this SDS for classification of substance.

State regulations

Massachusetts : The following components are listed: CARBON DIOXIDE; NITROGEN; NITROGEN (LIQUIFIED); OXYGEN (LIQUID)

New York : None of the components are listed.

New Jersey : The following components are listed: CARBON DIOXIDE; CARBONIC ACID GAS; NITROGEN; OXYGEN

Pennsylvania : The following components are listed: CARBON DIOXIDE; NITROGEN; OXYGEN

California Prop. 65

This product does not require a Safe Harbor warning under California Prop. 65.

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

Inventory list

Australia : All components are listed or exempted.

Canada : All components are listed or exempted.

China : All components are listed or exempted.

Europe : All components are listed or exempted.

Japan : **Japan inventory (ENCS)**: Not determined.
Japan inventory (ISHL): Not determined.

New Zealand : All components are listed or exempted.

Philippines : All components are listed or exempted.

Republic of Korea : All components are listed or exempted.

Taiwan : All components are listed or exempted.

Thailand : Not determined.

Turkey : Not determined.

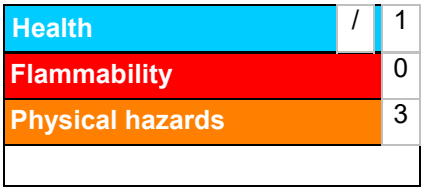
United States : All components are active or exempted.

Section 15. Regulatory information

Viet Nam : All components are listed or exempted.

Section 16. Other information

Hazardous Material Information System (U.S.A.)



Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings and the associated label are not required on SDSs or products leaving a facility under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered trademark and service mark of the American Coatings Association, Inc.

The customer is responsible for determining the PPE code for this material. For more information on HMIS® Personal Protective Equipment (PPE) codes, consult the HMIS® Implementation Manual.

National Fire Protection Association (U.S.A.)

Reprinted with permission from NFPA 704-2001, Identification of the Hazards of Materials for Emergency Response Copyright ©1997, National Fire Protection Association, Quincy, MA 02269. This reprinted material is not the complete and official position of the National Fire Protection Association, on the referenced subject which is represented only by the standard in its entirety.

Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Procedure used to derive the classification

Classification	Justification
GASES UNDER PRESSURE - Compressed gas	On basis of test data

History

Date of printing : 8/31/2021

Date of issue/Date of revision : 8/31/2021

Date of previous issue : 8/21/2019

Version : 2.02

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

References : Not available.

Notice to reader

Section 16. Other information

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

SAFETY DATA SHEET

Creation Date 08-Nov-2010 **Revision Date** 18-Jun-2015 **Revision Number** 2

1. Identification

Product Name **Fluoranthene**

Cat No. : **AC119170000; AC119170250; AC119171000; AC119175000**

Synonyms Benzo[j,k]fluorene

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Entity / Business Name
Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute oral toxicity	Category 4

Label Elements

Signal Word
Warning

Hazard Statements
Harmful if swallowed

Precautionary Statements
Prevention
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Ingestion
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell

Rinse mouth

Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

Very toxic to aquatic life with long lasting effects

3. Composition / information on ingredients

Component	CAS-No	Weight %
Fluoranthene	206-44-0	>95

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.

Skin Contact Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Obtain medical attention.

Inhalation Move to fresh air. If breathing is difficult, give oxygen. Obtain medical attention.

Ingestion Do not induce vomiting. Get medical attention.

Most important symptoms/effects No information available.

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Water spray. Carbon dioxide (CO_2). Dry chemical. alcohol-resistant foam.

Unsuitable Extinguishing Media No information available

Flash Point 100 °C / 212 °F

Method - No information available

Autoignition Temperature No information available

Explosion Limits

Upper No data available

Lower No data available

Sensitivity to Mechanical Impact No information available

Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical

Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products

Carbon monoxide (CO) Carbon dioxide (CO_2)

Protective Equipment and Precautions for Firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
2	0	0	N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment.

Environmental Precautions See Section 12 for additional ecological information. Avoid release to the environment. Collect spillage.

Methods for Containment and Clean Up Sweep up or vacuum up spillage and collect in suitable container for disposal.

7. Handling and storage

Handling Ensure adequate ventilation. Wear personal protective equipment. Avoid contact with skin and eyes. Do not breathe dust. Do not breathe vapors or spray mist. Avoid dust formation.

Storage Keep in a dry, cool and well-ventilated place. Keep container tightly closed.

8. Exposure controls / personal protection

Exposure Guidelines This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Engineering Measures Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Powder Solid
Appearance	Light green
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	109 - 111 °C / 228.2 - 231.8 °F
Boiling Point/Range	384 - 34 °C / 723.2 - 93.2 °F
Flash Point	100 °C / 212 °F
Evaporation Rate	No information available
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	No information available
Relative Density	No information available
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	C16 H10
Molecular Weight	202.25

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products.

Incompatible Materials Strong oxidizing agents

Hazardous Decomposition Products Carbon monoxide (CO), Carbon dioxide (CO_2)

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information No acute toxicity information is available for this product

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Fluoranthene	2 g/kg (Rat)	3180 mg/kg (Rabbit)	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Fluoranthene	206-44-0	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known

STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated. See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Fluoranthene	Not listed	Oncorhynchus mykiss: LC50=0.0077 mg/L 96h	Not listed	EC50: 0.78 mg/L 20h

Persistence and Degradability No information available
Bioaccumulation/ Accumulation No information available.

Mobility .

Component	log Pow
Fluoranthene	5.33

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

Component	RCRA - U Series Wastes	RCRA - P Series Wastes
Fluoranthene - 206-44-0	U120	-

14. Transport information

DOT
- **UN-No** UN3077
- **Proper Shipping Name** ENVIRONMENTALLY HAZARDOUS SUBSTANCE,SOLID, N.O.S.
- **Proper technical name** (Fluoranthene)
- **Hazard Class** 9
- **Packing Group** III

TDG
- **UN-No** UN3077
- **Proper Shipping Name** ENVIRONMENTALLY HAZARDOUS SUBSTANCE,SOLID, N.O.S.
- **Hazard Class** 9
- **Packing Group** III

IATA
- **UN-No** UN3077
- **Proper Shipping Name** Environmentally hazardous substance, solid, n.o.s
- **Hazard Class** 9
- **Packing Group** III

IMDG/IMO
- **UN-No** UN3077
- **Proper Shipping Name** Environmentally hazardous substance, solid, n.o.s
- **Hazard Class** 9
- **Packing Group** III

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Fluoranthene	X	-	X	205-912-4	-		-	X	X	X	-

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).

Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Fluoranthene	206-44-0	>95	1.0 0.1

SARA 311/312 Hazardous Categorization

Acute Health Hazard	Yes
Chronic Health Hazard	No
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Fluoranthene	-	-	X	X

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Fluoranthene	100 lb	-

California Proposition 65 This product does not contain any Proposition 65 chemicals

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Fluoranthene	X	X	X	-	-

U.S. Department of Transportation

Reportable Quantity (RQ):	N
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class D1B Toxic materials

16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 08-Nov-2010
Revision Date 18-Jun-2015
Print Date 18-Jun-2015
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer

The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS

SAFETY DATA SHEET

Revision Date 10-Feb-2015 **Revision Number** 1

1. Identification

Product Name **Fluorene**

Cat No. : **AC156130000; AC156130250; AC156131000; AC156135000**

Synonyms Diphenylenemethane

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Entity / Business Name
Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
Classification under 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Label Elements
None required

Hazards not otherwise classified (HNOC)
Very toxic to aquatic life with long lasting effects
May form combustible dust concentrations in air

3. Composition / information on ingredients

Component	CAS-No	Weight %
Fluorene	86-73-7	98

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.

Skin Contact Wash off immediately with soap and plenty of water while removing all contaminated

clothes and shoes. Obtain medical attention.

Inhalation Remove from exposure, lie down. Move to fresh air. Obtain medical attention.

Ingestion Clean mouth with water. Get medical attention.

Most important symptoms/effects No information available.
Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Water spray. Carbon dioxide (CO_2). Dry chemical. chemical foam.

Unsuitable Extinguishing Media No information available

Flash Point 151 °C / 303.8 °F
Method - No information available

Autoignition Temperature Not applicable
Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Dust can form an explosive mixture in air. Do not allow run-off from fire fighting to enter drains or water courses.

Hazardous Combustion Products
None known
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
0	1	0	N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment.
Environmental Precautions Do not flush into surface water or sanitary sewer system. Do not allow material to contaminate ground water system. Prevent product from entering drains. Local authorities should be advised if significant spillages cannot be contained.

Methods for Containment and Clean Up Sweep up or vacuum up spillage and collect in suitable container for disposal. Do not let this chemical enter the environment.

7. Handling and storage

Handling Avoid contact with skin and eyes. Do not breathe dust. Do not ingest.

Storage Keep in a dry, cool and well-ventilated place. Keep container tightly closed.

8. Exposure controls / personal protection

Exposure Guidelines This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Engineering Measures Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

Eye/face Protection	Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin and body protection	Wear appropriate protective gloves and clothing to prevent skin exposure.
Respiratory Protection	No protective equipment is needed under normal use conditions.
Hygiene Measures	Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Powder Solid
Appearance	Beige
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	112 - 116 °C / 233.6 - 240.8 °F
Boiling Point/Range	298 °C / 568.4 °F @ 760 mmHg
Flash Point	151 °C / 303.8 °F
Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	13 hPa @ 146 °C
Vapor Density	Not applicable
Relative Density	1.200
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	Not applicable
Decomposition Temperature	No information available
Viscosity	Not applicable
Molecular Formula	C13 H10
Molecular Weight	166.22

10. Stability and reactivity

Reactive Hazard	None known, based on information available
Stability	Stable under normal conditions.
Conditions to Avoid	Incompatible products.
Incompatible Materials	Strong oxidizing agents
Hazardous Decomposition Products	None under normal use conditions
Hazardous Polymerization	No information available.
Hazardous Reactions	None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information	No acute toxicity information is available for this product
Component Information	

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Fluorene	86-73-7	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known
STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated. See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. The product contains following substances which are hazardous for the environment.

Persistence and Degradability Insoluble in water May persist
Bioaccumulation/ Accumulation No information available.

Mobility . Is not likely mobile in the environment due its low water solubility.

Component	log Pow
Fluorene	4.18

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT Not regulated
TDG Not regulated
IATA
- **UN-No** 3077
- **Proper Shipping Name** ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.*
- **Hazard Class** 9
- **Packing Group** III

IMDG/IMO

UN-No	3077
Proper Shipping Name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.
Hazard Class	9
Packing Group	III

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Fluorene	X	X	-	201-695-5	-		X	X	X	X	-

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313 Not applicable

SARA 311/312 Hazardous Categorization

Acute Health Hazard	No
Chronic Health Hazard	No
Fire Hazard	Yes
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Fluorene	-	-	X	X

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Fluorene	5000 lb	-

California Proposition 65 This product does not contain any Proposition 65 chemicals

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Fluorene	X	X	X	-	-

U.S. Department of Transportation

Reportable Quantity (RQ):	N
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class B4 Flammable solid

16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Revision Date 10-Feb-2015
Print Date 10-Feb-2015
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

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End of SDS

Safety Data Sheet

Material Name: Fuel Oil No. 2

SDS No. 0088
EU/CLP GHS

Synonyms: #2 Heating Oil; 2 Oil; Off-road Diesel Fuel

* * * Section 1 - Product and Company Identification * * *

Manufacturer Information

Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095-0961

Phone: 732-750-6000 Corporate EHS
Emergency # 800-424-9300 CHEMTREC
www.hess.com (Environment, Health, Safety Internet Website)

* * * Section 2 - Hazards Identification * * *

GHS Classification:

Flammable Liquids - Category 3
Acute Toxicity, Inhalation - Category 4
Skin Corrosion/Irritation – Category 2
Eye Damage/Irritation – Category 2
Carcinogenicity - Category 2
Specific Target Organ Toxicity (Single Exposure) – Category 3 (respiratory irritation, narcosis)
Aspiration Hazard – Category 1
Hazardous to the Aquatic Environment, Acute Hazard – Category 3

GHS LABEL ELEMENTS

Symbol(s)

Signal Word

DANGER

Hazard Statements

Flammable liquid and vapor.
Harmful if inhaled.
Causes skin irritation.
Causes eye irritation.
Suspected of causing cancer.
Suspected of causing genetic defects.
May cause respiratory irritation.
May cause drowsiness or dizziness.
May be fatal if swallowed and enters airways.
Harmful to aquatic life.

Precautionary Statements

Prevention

Keep away from heat/sparks/open flames/hot surfaces. No smoking
Keep container tightly closed.
Ground/bond container and receiving equipment.
Use explosion-proof electrical/ventilating/lighting/equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Wear protective gloves/protective clothing/eye protection/face protection.
Avoid breathing fume/mist/vapors/spray.
Use only outdoors or in a well-ventilated area.
Wash hands and forearms thoroughly after handling.
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Avoid release to the environment.

Response

In case of fire: Use water spray, fog or foam.
If on skin (or hair): Wash with plenty of soap and water. Take off immediately all contaminated clothing and wash it before reuse. If skin irritation occurs, get medical advice/attention.
If inhaled: Remove person to fresh air and keep comfortable for breathing. Call a poison center or doctor if you feel unwell.
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.
If exposed or concerned: Get medical advice/attention.
If swallowed: Immediately all a poison center or doctor/physician if you feel unwell. Do NOT induce vomiting.

Storage

Store in a well ventilated place.
Keep cool. Keep container tightly closed.
Store locked up.

Disposal

Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 3 - Composition / Information on Ingredients * * *

CAS #	Component	Percent
68476-30-2	Fuel oil No. 2	100
91-20-3	Naphthalene	<0.1

A complex combination of hydrocarbons with carbon numbers in the range C9 and higher produced from the distillation of petroleum crude oil.

* * * Section 4 - First Aid Measures * * *

First Aid: Eyes

In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

First Aid: Skin

Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or with waterless hand cleanser. Obtain medical attention if irritation or redness develops.

First Aid: Ingestion

DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Monitor for breathing difficulties. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

First Aid: Inhalation

Remove person to fresh air. If person is not breathing, provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

* * * Section 5 - Fire Fighting Measures * * *

General Fire Hazards

See Section 9 for Flammability Properties.

Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

Hazardous Combustion Products

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

Extinguishing Media

SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO2, water spray, fire fighting foam, or gaseous extinguishing agent.

LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

Unsuitable Extinguishing Media

None

Fire Fighting Equipment/Instructions

Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment. Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing. Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

* * * Section 6 - Accidental Release Measures * * *

Recovery and Neutralization

Carefully contain and stop the source of the spill, if safe to do so.

Materials and Methods for Clean-Up

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal.

Emergency Measures

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Personal Precautions and Protective Equipment

Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

Environmental Precautions

Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Prevention of Secondary Hazards

None

* * * Section 7 - Handling and Storage * * *

Handling Procedures

Handle as a combustible liquid. Keep away from heat, sparks, excessive temperatures and open flame! No smoking or open flame in storage, use or handling areas. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when this product is loaded into tanks previously containing low flash point products (such as gasoline) - see API Publication 2003, "Protection Against Ignitions Arising Out Of Static, Lightning and Stray Currents."

Storage Procedures

Keep containers closed and clearly labeled. Use approved vented storage containers. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks."

Incompatibilities

Keep away from strong oxidizers; Fluorel ®

* * * Section 8 - Exposure Controls / Personal Protection * * *

Component Exposure Limits

Fuel oil No. 2 (270-671-4)

ACGIH: 100 mg/m3 TWA (inhalable fraction and vapor, as total hydrocarbons, listed under Diesel fuel)
Skin - potential significant contribution to overall exposure by the cutaneous route (listed under Diesel fuel)
Belgium: 100 mg/m3 TWA (as total hydrocarbon, aerosol and vapor)
Skin (listed under Gas oil)
Portugal: 100 mg/m3 TWA [VLE-MP] (aerosol and vapor, as total Hydrocarbons, listed under Fuel diesel)

Naphthalene (202-049-5)

ACGIH: 15 ppm STEL
10 ppm TWA
Skin - potential significant contribution to overall exposure by the cutaneous route
Austria: 10 ppm TWA [TMW]; 50 mg/m3 TWA [TMW]
skin notation
Belgium: 15 ppm STEL; 80 mg/m3 STEL
10 ppm TWA; 53 mg/m3 TWA
Skin
Denmark: 10 ppm TWA; 50 mg/m3 TWA
Finland: 2 ppm STEL; 10 mg/m3 STEL
1 ppm TWA; 5 mg/m3 TWA
France: 10 ppm TWA [VME]; 50 mg/m3 TWA [VME]
Germany: 0.1 ppm TWA AGW (The risk of damage to the embryo or fetus can be excluded when MAK and BAT values are observed, inhalable fraction, exposure factor 1); 0.5 mg/m3 TWA AGW (The risk of damage to the embryo or fetus can be excluded when MAK and BAT values are observed, inhalable fraction, exposure factor 1)
Greece: 10 ppm TWA; 50 mg/m3 TWA
Ireland: 15 ppm STEL; 75 mg/m3 STEL
10 ppm TWA; 50 mg/m3 TWA
Netherlands: 80 mg/m3 STEL
50 mg/m3 TWA
Portugal: 10 ppm TWA [VLE-MP]
Spain: 15 ppm STEL [VLA-EC]; 80 mg/m3 STEL [VLA-EC]
10 ppm TWA [VLA-ED]; 53 mg/m3 TWA [VLA-ED]
skin - potential for cutaneous exposure
Sweden: 10 ppm LLV; 50 mg/m3 LLV
15 ppm STV; 80 mg/m3 STV

Engineering Measures

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

Personal Protective Equipment: Respiratory

A NIOSH/MSHA-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited.

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

Personal Protective Equipment: Hands

Gloves constructed of nitrile, neoprene, or PVC are recommended.

Personal Protective Equipment: Eyes

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

Personal Protective Equipment: Skin and Body

Chemical protective clothing such as of E.I. DuPont TyChem®, Saranex® or equivalent recommended based on degree of exposure. Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

* * * Section 9 - Physical & Chemical Properties * * *

Appearance:	Red or reddish/orange colored (dyed)	**Odor:**	Mild, petroleum distillate odor
Physical State:	Liquid	**pH:**	ND
Vapor Pressure:	0.009 psia @ 70 °F (21 °C)	**Vapor Density:**	>1.0
Boiling Point:	340 to 700 °F (171 to 371 °C)	**Melting Point:**	ND
Solubility (H2O):	Negligible	**Specific Gravity:**	AP 0.823-0871
Evaporation Rate:	Slow; varies with conditions	**VOC:**	ND
Octanol/H2O Coeff.:	ND	**Flash Point:**	100 °F (38 °C) minimum
Flash Point Method:	PMCC	**Upper Flammability Limit (UFL):**	7.5
Lower Flammability Limit (LFL):	0.6	**Burning Rate:**	ND
Auto Ignition:	494°F (257°C)		

* * * Section 10 - Chemical Stability & Reactivity Information * * *

Chemical Stability

This is a stable material.

Hazardous Reaction Potential

Will not occur.

Conditions to Avoid

Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources.

Incompatible Products

Keep away from strong oxidizers; Fluorel ®

Hazardous Decomposition Products

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

* * * Section 11 - Toxicological Information * * *

Acute Toxicity

A: General Product Information

Harmful if swallowed.

B: Component Analysis - LD50/LC50

Fuel oil No. 2 (68476-30-2)

Oral LD50 Rat 12 g/kg; Dermal LD50 Rabbit 4720 µL/kg; Dermal LD50 Rabbit >2000 mg/kg; Inhalation LC50 Rat 4.6 mg/L 4 h

Naphthalene (91-20-3)

Inhalation LC50 Rat >340 mg/m3 1 h; Oral LD50 Rat 490 mg/kg; Dermal LD50 Rat >2500 mg/kg; Dermal LD50 Rabbit >20 g/kg

Product Mixture

Oral LD50 Rat 14.5 ml/kg; Dermal LD50 Rabbit >5 mL/kg; Guinea Pig Sensitization: negative; Primary dermal irritation: moderately irritating (Draize mean irritation score - 3.98 rabbits); Draize eye irritation: mildly irritating (Draize score, 48 hours, unwashed - 2.0 rabbits)

Potential Health Effects: Skin Corrosion Property/Stimulativeness

Practically non-toxic if absorbed following acute (single) exposure. May cause skin irritation with prolonged or repeated contact. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are repeatedly exposed.

Potential Health Effects: Eye Critical Damage/ Stimulativeness

Contact with eyes may cause mild irritation.

Potential Health Effects: Ingestion

Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

Potential Health Effects: Inhalation

Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

WARNING: the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

Respiratory Organs Sensitization/Skin Sensitization

This product is not reported to have any skin sensitization effects.

Generative Cell Mutagenicity

This product is not reported to have any mutagenic effects. Material of similar composition has been positive in a mutagenicity study.

Carcinogenicity

A: General Product Information

Suspected of causing cancer.

Dermal carcinogenicity: positive - mice

Studies have shown that similar products produce skin tumors in laboratory animals following repeated applications without washing or removal. The significance of this finding to human exposure has not been determined. Other studies with active skin carcinogens have shown that washing the animal's skin with soap and water between applications reduced tumor formation.

This product is similar to Diesel Fuel. IARC classifies whole diesel fuel exhaust particulates as probably carcinogenic to humans (Group 2A) and NIOSH regards it as a potential cause of occupational lung cancer based on animal studies and limited evidence in humans.

B: Component Carcinogenicity

Fuel oil No. 2 (68476-30-2)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans (listed under Diesel fuel)

Naphthalene (91-20-3)

ACGIH: A4 - Not Classifiable as a Human Carcinogen
NTP: Reasonably Anticipated To Be A Human Carcinogen (Possible Select Carcinogen)
IARC: Monograph 82 [2002] (Group 2B (possibly carcinogenic to humans))

Reproductive Toxicity

This product is not reported to have any reproductive toxicity effects.

Specified Target Organ General Toxicity: Single Exposure

This product is not reported to have any specific target organ general toxicity single exposure effects.

Specified Target Organ General Toxicity: Repeated Exposure

This product is not reported to have any specific target organ general toxicity repeat exposure effects.

Aspiration Respiratory Organs Hazard

The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

* * * Section 12 - Ecological Information * * *

Ecotoxicity

A: General Product Information

Very toxic to aquatic life with long lasting effects. Keep out of sewers, drainage areas and waterways. Report spills and releases, as applicable, under Federal and State regulations.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Fuel oil No. 2 (68476-30-2)

Test & Species		Conditions
96 Hr LC50 Pimephales promelas	35 mg/L [flow-through]	

Naphthalene (91-20-3)

Test & Species		Conditions
96 Hr LC50 Pimephales promelas	5.74-6.44 mg/L [flow-through]	
96 Hr LC50 Oncorhynchus mykiss	1.6 mg/L [flow-through]	

96 Hr LC50 Oncorhynchus mykiss	0.91-2.82 mg/L [static]
96 Hr LC50 Pimephales promelas	1.99 mg/L [static]
96 Hr LC50 Lepomis macrochirus	31.0265 mg/L [static]
72 Hr EC50 Skeletonema costatum	0.4 mg/L
48 Hr LC50 Daphnia magna	2.16 mg/L
48 Hr EC50 Daphnia magna	1.96 mg/L [Flow through]
48 Hr EC50 Daphnia magna	1.09 - 3.4 mg/L [Static]

Persistence/Degradability
No information available.

Bioaccumulation
No information available.

Mobility in Soil
No information available.

* * * Section 13 - Disposal Considerations * * *

Waste Disposal Instructions
See Section 7 for Handling Procedures. See Section 8 for Personal Protective Equipment recommendations.

Disposal of Contaminated Containers or Packaging
Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 14 - Transportation Information * * *

IATA Information
Shipping Name: Heating oil, light
UN #: 1202 **Hazard Class:** 3 **Packing Group:** III

ICAO Information
Shipping Name: Heating oil, light
UN #: 1202 **Hazard Class:** 3 **Packing Group:** III

IMDG Information
Shipping Name: Heating oil, light
UN #: 1202 **Hazard Class:** 3 **Packing Group:** III

* * * Section 15 - Regulatory Information * * *

Regulatory Information

Component Analysis – Inventory

Component/CAS	EC #	EEC	CAN	TSCA
Fuel oil No. 2 68476-30-2	270-671-4	EINECS	DSL	Yes
Naphthalene 91-20-3	202-049-5	EINECS	DSL	Yes

* * * Section 16 - Other Information * * *

Key/Legend

ACGIH = American Conference of Governmental Industrial Hygienists; ADG = Australian Code for the Transport of Dangerous Goods by Road and Rail; ADR/RID = European Agreement of Dangerous Goods by Road/Rail; AS = Standards Australia; DFG = Deutsche Forschungsgemeinschaft; DOT = Department of Transportation; DSL = Domestic Substances List; EEC = European Economic Community; EINECS = European Inventory of Existing Commercial Chemical Substances; ELINCS = European List of Notified Chemical Substances; EU = European Union; HMIS = Hazardous Materials Identification System; IARC = International Agency for Research on Cancer; IMO = International Maritime Organization; IATA = International Air Transport Association; MAK = Maximum Concentration Value in the Workplace; NDSL = Non-Domestic Substances List; NFPA = National Fire Protection Association; NOHSC = National Occupational Health & Safety Commission; NTP = National Toxicology Program; STEL = Short-term Exposure Limit; TDG = Transportation of Dangerous Goods; TLV = Threshold Limit Value; TSCA = Toxic Substances Control Act; TWA = Time Weighted Average

Literature References

None

Other Information

Information presented herein has been compiled from sources considered to be dependable, and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgment.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.

End of Sheet

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Version 6.2
Revision Date 23.06.2020
Print Date 19.06.2021
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	trans-Chlordane
Product Number	:	ERC-004
Brand	:	Cerilliant
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	5103-74-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Inc. 3050 SPRUCE ST ST. LOUIS MO 63103 UNITED STATES
Telephone	:	+1 314 771-5765
Fax	:	+1 800 325-5052

1.4 Emergency telephone

Emergency Phone #	:	800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Acute toxicity, Oral (Category 3), H301
Acute toxicity, Inhalation (Category 4), H332
Carcinogenicity (Category 2), H351
Short-term (acute) aquatic hazard (Category 1), H400
Long-term (chronic) aquatic hazard (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008

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Pictogram	
Signal word	Danger

Hazard statement(s)

H301	Toxic if swallowed.
H332	Harmful if inhaled.
H351	Suspected of causing cancer.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201	Obtain special instructions before use.
P273	Avoid release to the environment.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER/ doctor. Rinse mouth.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor if you feel unwell.
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Molecular weight	:	409,78 g/mol
CAS-No.	:	5103-74-2
EC-No.	:	225-826-0

Component	Classification	Concentration
trans-Chlordane		
	Acute Tox. 3; Acute Tox. 4; Carc. 2; Aquatic Acute 1; Aquatic Chronic 1; H301, H332, H351, H400, H410 M-Factor - Aquatic Acute: 10	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice

Consult a physician. Show this material safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

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In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust. For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed. For precautions see section 2.2.

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7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Store in cool place.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of Regulation (EU) 2016/425 and the standard EN 374 derived from it.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: crystalline Color: white
b)	Odor	odorless

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c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Relative density	1,590 g/cm3
n)	Water solubility	insoluble
o)	Partition coefficient: n-octanol/water	No data available
p)	Autoignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available

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Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 200 mg/kg
LD50 Oral - Mouse - 145 mg/kg
Inhalation: (Regulation (EC) No 1272/2008, Annex VI)

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity

Carcinogenicity
Suspected of causing cancer.

IARC: 2B - Group 2B: Possibly carcinogenic to humans (trans-Chlordane)

Reproductive toxicity

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: Not available

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 0,044 mg/l - 96,0 h Remarks: (in analogy to similar products)
	LOEC - Pimephales promelas (fathead minnow) - 0,025 mg/l - 48,0 h Remarks: (in analogy to similar products)

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Toxicity to daphnia and other aquatic invertebrates	LOEC - Daphnia magna (Water flea) - 0,07 mg/l - 48 h Remarks: (in analogy to similar products)
	LC50 - Daphnia magna (Water flea) - 0,0984 mg/l - 48 h Remarks: (in analogy to similar products)

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects
Very toxic to aquatic life with long lasting effects.
No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Waste material must be disposed of in accordance with the Directive on waste 2008/98/EC as well as other national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number
ADR/RID: 3077 IMDG: 3077 IATA: 3077

14.2 UN proper shipping name
ADR/RID: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (trans-Chlordane)
IMDG: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (trans-Chlordane)
IATA: Environmentally hazardous substance, solid, n.o.s. (trans-Chlordane)

14.3 Transport hazard class(es)
ADR/RID: 9 IMDG: 9 IATA: 9

14.4 Packaging group
ADR/RID: III IMDG: III IATA: III

14.5 Environmental hazards
ADR/RID: yes IMDG Marine pollutant: yes IATA: yes

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14.6 Special precautions for user

No data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

This material safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H301	Toxic if swallowed.
H332	Harmful if inhaled.
H351	Suspected of causing cancer.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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SAFETY DATA SHEET

SDS ID NO.: 0127MAR019
Revision Date: 06/01/2016

1. IDENTIFICATION

Product Name: Marathon Petroleum Gasoline - All Grades

Synonym: Gasoline; Regular Unleaded Gasoline; Conventional Regular Unleaded Gasoline; Mid Grade Unleaded Gasoline; Conventional Mid Grade Unleaded Gasoline; Premium Unleaded Gasoline; Conventional Premium Unleaded Gasoline; Sub-Octane Gasoline; Regular RBOB; Super RBOB; Premium RBOB; RBOB; Reformulated Blend Stock For Oxygenated Blending; 84 Octane Gasoline; CBOB; Premium CBOB; Conventional Blend Stock for Oxygenate Blending; Recreational Gasoline; Recreational Gasoline; Recreational Unleaded Gasoline; 89 Recreational Gasoline; Brand 89 Recreational Gasoline; 7.0 Max RVP 89 Recreational Gasoline; BR 7.0 Max RVP 89 Recreational Gasoline; 90 Recreational Gasoline; 90 Marina Gasoline; Brand 91 Recreational Gasoline; 91 Recreational Gasoline; 91 Marina Gasoline; 90 Octane Midgrade Gasoline with No Ethanol; 0125MAR019; 0126MAR019; 0134MAR019; 0313MAR019; 0314MAR019

Chemical Family: Complex Hydrocarbon Substance

Recommended Use: Fuel.
Restrictions on Use: All others.

Manufacturer, Importer, or Responsible Party Name and Address:

MARATHON PETROLEUM COMPANY LP
539 South Main Street
Findlay, OH 45840

SDS information: 1-419-421-3070

Emergency Telephone: 1-877-627-5463

2. HAZARD IDENTIFICATION

Classification

OSHA Regulatory Status
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable liquids	Category 1
Skin corrosion/irritation	Category 2
Germ cell mutagenicity	Category 1B
Carcinogenicity	Category 1B
Reproductive toxicity	Category 2
Specific target organ toxicity (single exposure)	Category 3
Aspiration toxicity	Category 1
Acute aquatic toxicity	Category 2
Chronic aquatic toxicity	Category 2

Hazards Not Otherwise Classified (HNOC)

Static accumulating flammable liquid

Label elements

EMERGENCY OVERVIEW

Danger

EXTREMELY FLAMMABLE LIQUID AND VAPOR
May accumulate electrostatic charge and ignite or explode
May be fatal if swallowed and enters airways
Causes skin irritation
May cause respiratory irritation
May cause drowsiness or dizziness
May cause genetic defects
May cause cancer
Suspected of damaging fertility or the unborn child
Toxic to aquatic life with long lasting effects

Appearance Clear yellow liquid **Physical State** Liquid **Odor** Hydrocarbon

Precautionary Statements - Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Keep container tightly closed
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting/equipment
Use only non-sparking tools.
Take precautionary measures against static discharge
Avoid breathing mist/vapors/spray
Use only outdoors or in a well-ventilated area
Wear protective gloves/protective clothing/eye protection/face protection
Wash hands and any possibly exposed skin thoroughly after handling
Avoid release to the environment

Precautionary Statements - Response
IF exposed or concerned: Get medical attention
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
If skin irritation occurs: Get medical attention
Wash contaminated clothing before reuse
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor if you feel unwell
IF SWALLOWED: Immediately call a POISON CENTER or doctor
Do NOT induce vomiting
In case of fire: Use water spray, fog or regular foam for extinction
Collect spillage

Precautionary Statements - Storage
Store in a well-ventilated place. Keep container tightly closed
Keep cool
Store locked up

Precautionary Statements - Disposal
Dispose of contents/container at an approved waste disposal plant

3. COMPOSITION/INFORMATION ON INGREDIENTS

Gasoline is a complex combination of hydrocarbons consisting of paraffins, cycloparaffins, aromatic and olefinic hydrocarbons having molecular chains ranging in length from four to ten carbons. May contain small amounts of dye and other additives (>0.02%) which are not considered hazardous at the concentrations used.

Composition Information:

Name	CAS Number	% Concentration
Gasoline	86290-81-5	100
Heptane (mixed isomers)	142-82-5	2.5-26
Pentane (mixed isomers)	78-78-4	6.5-19
Butane (mixed isomers)	106-97-8	0.5-14
Hexane Isomers (other than n-Hexane)	107-83-5	2-12
Toluene	108-88-3	3-9.5
Xylene (mixed isomers)	1330-20-7	3.5-9.5
n-Hexane	110-54-3	0.1-4.5
Cumene	98-82-8	0-4
1,2,4 Trimethylbenzene	95-63-6	1-4
Ethylbenzene	100-41-4	0.5-2.5
Benzene	71-43-2	0.1-1.5
Cyclohexane	110-82-7	0-1.5
Octane	111-65-9	0-1.5
1,2,3-trimethylbenzene	526-73-8	0-1
Naphthalene	91-20-3	0.1-0.5

All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume.

4. FIRST AID MEASURES

First Aid Measures

General Advice: In case of accident or if you feel unwell, seek medical advice immediately (show directions for use or safety data sheet if possible).

Inhalation: Remove to fresh air. If not breathing, institute rescue breathing. If breathing is difficult, ensure airway is clear, give oxygen and continue to monitor. If heart has stopped, immediately begin cardiopulmonary resuscitation (CPR). Keep affected person warm and at rest. If symptoms occur get medical attention.

Skin Contact: Immediately wash exposed skin with plenty of soap and water while removing contaminated clothing and shoes. May be absorbed through the skin in harmful amounts. Get medical attention if irritation persists. Any injection injury from high pressure equipment should be evaluated immediately by a physician as potentially serious (See NOTES TO PHYSICIAN).

Place contaminated clothing in closed container until cleaned or discarded. If clothing is to be laundered, inform the person performing the operation of contaminant's hazardous properties. Destroy contaminated, non-chemical resistant footwear.

Eye Contact: Flush immediately with large amounts of water for at least 15 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing. Gently remove contacts while flushing. Get medical attention if irritation persists.

Ingestion: Do not induce vomiting because of danger of aspirating liquid into lungs, causing serious damage and chemical pneumonitis. If spontaneous vomiting occurs, keep head below hips, or if patient is lying down, turn body and head to side to prevent aspiration and monitor for breathing difficulty. Never give anything by mouth to an unconscious person. Keep affected person warm and at rest. GET IMMEDIATE MEDICAL ATTENTION.

Most important signs and symptoms, both short-term and delayed with overexposure

Adverse Effects: Irritating to the skin and mucous membranes. Symptoms may include redness, itching, and inflammation. May cause nausea, vomiting, diarrhea, and signs of nervous system depression: headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue. Aspiration hazard. May cause coughing, chest pains, shortness of breath, pulmonary edema and/or chemical pneumonitis. Repeated or prolonged skin contact may cause drying, reddening, itching and cracking.

Indication of any immediate medical attention and special treatment needed

Notes To Physician: INHALATION: This material (or a component) sensitizes the myocardium to the effects of sympathomimetic amines. Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in individuals exposed to this material. Administration of sympathomimetic drugs should be avoided.

SKIN: Leaks or accidents involving high-pressure equipment may inject a stream of material through the skin and initially produce an injury that may not appear serious. Only a small puncture wound may appear on the skin surface but, without proper treatment and depending on the nature, original pressure, volume, and location of the injected material, can compromise blood supply to an affected body part. Prompt surgical debridement of the wound may be necessary to prevent irreversible loss of function and/or the affected body part. High pressure injection injuries may be SERIOUS SURGICAL EMERGENCIES.

INGESTION: This material represents a significant aspiration and chemical pneumonitis hazard. Induction of emesis is not recommended.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
For small fires, Class B fire extinguishing media such as CO2, dry chemical, foam (AFFF/ATC) or water spray can be used. For large fires, water spray, fog or foam (AFFF/ATC) can be used. Firefighting should be attempted only by those who are adequately trained and equipped with proper protective equipment.

Unsuitable extinguishing media
Do not use straight water streams to avoid spreading fire.

Specific hazards arising from the chemical
This product has been determined to be an extremely flammable liquid per the OSHA Hazard Communication Standard and should be handled accordingly. May accumulate electrostatic charge and ignite or explode. Vapors may travel along the ground or be moved by ventilation and ignited by many sources such as pilot lights, sparks, electric motors, static discharge, or other ignition sources at locations distant from material handling. Flashback can occur along vapor trail. For additional fire related information, see NFPA 30 or the Emergency Response Guidebook 128.

Hazardous combustion products
Smoke, carbon monoxide, and other products of incomplete combustion.

Explosion data
Sensitivity to Mechanical Impact No.
Sensitivity to Static Discharge Yes.

Special protective equipment and precautions for firefighters
Firefighters should wear full protective clothing and positive-pressure self-contained breathing apparatus (SCBA) with a full face-piece, as appropriate. Avoid using straight water streams. Water may be ineffective in extinguishing low flash point fires, but can be used to cool exposed surfaces. Avoid excessive water spray application. Water spray and foam (AFFF/ATC) must be applied carefully to avoid frothing and from as far a distance as possible. Keep run-off water out of sewers and water sources.

Additional firefighting tactics
FIRES INVOLVING TANKS OR CAR/TRAILER LOADS: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with flooding quantities of water until well after the fire is out. Do not direct water at source of leak or safety devices; icing may occur. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from tanks engulfed in fire. For massive fire, use unmanned hose holders or monitor nozzles: if this is impossible, withdraw from area and let fire burn.

EVACUATION: Consider initial downwind evacuation for at least 1000 feet. If tank, rail car or tank truck is involved in a fire, ISOLATE for 5280 feet (1 mile) in all directions; also, consider initial evacuation of 5280 feet (1 mile) in all directions.

NFPA	Health 1	Flammability 3	Instability 0	Special Hazard -

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Keep public away. Isolate and evacuate area. Shut off source if safe to do so. Eliminate all ignition sources.
Protective equipment:	Use personal protection measures as recommended in Section 8.
Emergency procedures:	Advise authorities and National Response Center (800-424-8802) if the product has entered a water course or sewer. Notify local health and pollution control agencies, if appropriate.
Environmental precautions:	Avoid release to the environment. Avoid subsoil penetration. Ethanol in gasoline phase seperates in contact with water. Monitor downstream for dissolved ethanol or other appropriate indicators.
Methods and materials for containment:	Contain liquid with sand or soil. Prevent spilled material from entering storm drains, sewers, and open waterways.
Methods and materials for cleaning up:	Use suitable absorbent materials such as vermiculite, sand, or clay to clean up residual liquids. Recover and return free product to proper containers. When recovering free liquids ensure all equipment is grounded and bonded. Use only non-sparking tools.

7. HANDLING AND STORAGE

Safe Handling Precautions:

NEVER SIPHON THIS PRODUCT BY MOUTH. Use appropriate grounding and bonding practices. Static accumulating flammable liquid. Bonding and grounding may be insufficient to eliminate the hazard from static electricity. Do not expose to heat, open flames, strong oxidizers or other sources of ignition. Vapors may travel along the ground or be moved by ventilation. Flashback may occur along vapor trails. No smoking. Use only non-sparking tools. Avoid contact with skin, eyes and clothing. Avoid breathing fumes, gas, or vapors. Use only with adequate ventilation. Avoid repeated and prolonged skin contact. Use personal protection measures as recommended in Section 8. Exercise good personal hygiene including removal of soiled clothing and prompt washing with soap and water. Do not cut, drill, grind or weld on empty containers since explosive residues may remain. Refer to applicable EPA, OSHA, NFPA and consistent state and local requirements.

Hydrocarbons are basically non-conductors of electricity and can become electrostatically charged during mixing, filtering, pumping at high flow rates or loading and transfer operations. If this charge reaches a sufficiently high level, sparks can form that may ignite the vapors of flammable liquids. Sudden release of hot organic chemical vapors or mists from process equipment operating under elevated temperature and pressure, or sudden ingress of air into vacuum equipment may result in ignition of vapors or mists without the presence of obvious ignition sources. Nozzle spouts must be kept in contact with the containers or tank during the entire filling operation.

Portable containers should never be filled while in or on a motor vehicle or marine craft. Containers should be placed on the ground. Static electric discharge can ignite fuel vapors when filling non-grounded containers or vehicles on trailers. The nozzle spout must be kept in contact with the container before and during the entire filling operation. Use only approved containers.

A buildup of static electricity can occur upon re-entry into a vehicle during fueling especially in cold or dry climate conditions. The charge is generated by the action of dissimilar fabrics (i.e., clothing and upholstery) rubbing across each other as a person enters/exits the vehicle. A flash fire can result from this discharge if sufficient flammable vapors are present. Therefore, do not get back in your vehicle while refueling.

Cellular phones and other electronic devices may have the potential to emit electrical charges (sparks). Sparks in potentially explosive atmospheres (including fueling areas such as gas stations) could cause an explosion if sufficient flammable vapors are present. Therefore, turn off cellular phones and other electronic devices when working in potentially explosive atmospheres or keep devices inside your vehicle during refueling.

High-pressure injection of any material through the skin is a serious medical emergency even though the small entrance wound at the injection site may not initially appear serious. These injection injuries can occur from high-pressure equipment such as paint spray or grease or guns, fuel injectors, or pinhole leaks in hoses or hydraulic lines and should all be considered serious. High pressure injection injuries may be SERIOUS SURGICAL EMERGENCIES (See First Aid Section 4).

Storage Conditions:

Store in properly closed containers that are appropriately labeled and in a cool, well-ventilated area. Do not store near an open flame, heat or other sources of ignition.

Incompatible Materials

Strong oxidizing agents.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Name	ACGIH TLV	OSHA PELS:	OSHA - Vacated PELs	NIOSH IDLH
Gasoline 86290-81-5	300 ppm TWA 500 ppm STEL	-	300 ppm TWA 900 mg/m^3 TWA 500 ppm STEL 1500 mg/m^3 STEL	-

Heptane (mixed isomers) 142-82-5	400 ppm TWA 500 ppm STEL	TWA: 500 ppm TWA: 2000 mg/m³	400 ppm TWA 1600 mg/m³ TWA 500 ppm STEL 2000 mg/m³ STEL	750 ppm
Pentane (mixed isomers) 78-78-4	1000 ppm TWA	-	-	-
Butane (mixed isomers) 106-97-8	1000 ppm STEL	-	800 ppm TWA 1900 mg/m³ TWA	-
Hexane Isomers (other than n-Hexane) 107-83-5	500 ppm TWA 1000 ppm STEL	-	500 ppm TWA 1800 mg/m³ TWA 1000 ppm STEL 3600 mg/m³ STEL	-
Toluene 108-88-3	20 ppm TWA	TWA: 200 ppm Ceiling: 300 ppm	100 ppm TWA 375 mg/m³ TWA 150 ppm STEL 560 mg/m³ STEL	500 ppm
Xylene (mixed isomers) 1330-20-7	100 ppm TWA 150 ppm STEL	TWA: 100 ppm TWA: 435 mg/m³	100 ppm TWA 435 mg/m³ TWA 150 ppm STEL 655 mg/m³ STEL	900 ppm
n-Hexane 110-54-3	50 ppm TWA Skin - potential significant contribution to overall exposure by the cutaneous route	TWA: 500 ppm TWA: 1800 mg/m³	50 ppm TWA 180 mg/m³ TWA	1100 ppm
Cumene 98-82-8	50 ppm TWA	TWA: 50 ppm TWA: 245 mg/m³ Skin	50 ppm TWA 245 mg/m³ TWA Limit applies to skin	900 ppm
1,2,4 Trimethylbenzene 95-63-6	25 ppm TWA	-	25 ppm TWA 125 mg/m³ TWA	-
Ethylbenzene 100-41-4	20 ppm TWA	TWA: 100 ppm TWA: 435 mg/m³	100 ppm TWA 435 mg/m³ TWA 125 ppm STEL 545 mg/m³ STEL	800 ppm
Benzene 71-43-2	0.5 ppm TWA 2.5 ppm STEL Skin - potential significant contribution to overall exposure by the cutaneous route	TWA: 10 ppm (applies to industry segments exempt from the benzene standard) TWA: 1 ppm STEL: 5 ppm (see 29 CFR 1910.1028)	25 ppm Ceiling 1 ppm TWA 5 ppm STEL	500 ppm
Cyclohexane 110-82-7	100 ppm TWA	TWA: 300 ppm TWA: 1050 mg/m³	300 ppm TWA 1050 mg/m³ TWA	1300 ppm
Octane 111-65-9	300 ppm TWA	TWA: 500 ppm TWA: 2350 mg/m³	300 ppm TWA 1450 mg/m³ TWA 375 ppm STEL 1800 mg/m³ STEL	1000 ppm
1,2,3-trimethylbenzene 526-73-8	25 ppm TWA	-	25 ppm TWA 125 mg/m³ TWA	-
Naphthalene 91-20-3	10 ppm TWA Skin - potential significant contribution to overall exposure by the cutaneous route	TWA: 10 ppm TWA: 50 mg/m³	10 ppm TWA 50 mg/m³ TWA 15 ppm STEL 75 mg/m³ STEL	250 ppm

Notes: The manufacturer has voluntarily elected to provide exposure limits contained in OSHA's 1989 air contaminants standard in its SDSs, even though certain of those exposure limits were vacated in 1992.

Engineering measures: Local or general exhaust required in an enclosed area or when there is inadequate ventilation. Use mechanical ventilation equipment that is explosion-proof.

Personal protective equipment

Eye protection:	Use goggles or face-shield if the potential for splashing exists.
Skin and body protection:	Use nitrile rubber, Viton® or PVA gloves for repeated or prolonged skin exposure. Glove suitability is based on workplace conditions and usage. Contact the glove manufacturer for specific advice on glove selection and breakthrough times.
Respiratory protection:	Use a NIOSH approved organic vapor chemical cartridge or supplied air respirators when there is the potential for airborne exposures to exceed permissible exposure limits or if excessive vapors are generated. Observe respirator assigned protection factors (APFs) criteria cited in federal OSHA 29 CFR 1910.134. Self-contained breathing apparatus should be used for fire fighting.
Hygiene measures:	Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes and clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical State	Liquid
Appearance	Clear yellow liquid
Color	Yellow
Odor	Hydrocarbon
Odor Threshold	No data available.

Property	**Values (Method)**
Melting Point / Freezing Point	No data available.
Initial Boiling Point / Boiling Range	24-210 °C / 75-410 °F (ASTM D86)
Flash Point	-43 °C / -45 °F
Evaporation Rate	No data available.
Flammability (solid, gas)	Not applicable.
Flammability Limit in Air (%):	
Upper Flammability Limit:	7.6
Lower Flammability Limit:	1.4
Explosion limits:	No data available.
Vapor Pressure	5.5-15 psi (ASTM D4814)
Vapor Density	3-4
Specific Gravity / Relative Density	0.70-0.76
Water Solubility	No data available.
Solubility in other solvents	No data available.
Partition Coefficient	2.13-4.5
Decomposition temperature	No data available.
pH:	Not applicable
Autoignition Temperature	280 °C / 536 °F
Kinematic Viscosity	No data available.
Dynamic Viscosity	No data available.
Explosive Properties	No data available.
VOC Content (%)	100%
Density	No data available.
Bulk Density	Not applicable.

10. STABILITY AND REACTIVITY

Reactivity	The product is non-reactive under normal conditions.
Chemical stability	The material is stable at 70°F, 760 mmHg pressure.
Possibility of hazardous reactions	None under normal processing.
Hazardous polymerization	Will not occur.

Conditions to avoid Excessive heat, sources of ignition, open flame.

Incompatible Materials Strong oxidizing agents.

Hazardous decomposition products None known under normal conditions of use.

11. TOXICOLOGICAL INFORMATION

Potential short-term adverse effects from overexposures

Inhalation May cause irritation of respiratory tract. May cause drowsiness or dizziness. Breathing high concentrations of this material in a confined space or by intentional abuse can cause irregular heartbeats which can cause death.

Eye contact Exposure to vapor or contact with liquid may cause mild eye irritation, including tearing, stinging, and redness.

Skin contact Causes skin irritation. Effects may become more serious with repeated or prolonged contact. May be absorbed through the skin in harmful amounts.

Ingestion May be fatal if swallowed or vomited and enters airways. May cause irritation of the mouth, throat and gastrointestinal tract.

Acute toxicological data

Name	Oral LD50	Dermal LD50	Inhalation LC50
Gasoline 86290-81-5	14000 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	> 5.2 mg/L (Rat) 4 h
Heptane (mixed isomers) 142-82-5	-	3000 mg/kg (Rabbit)	103 g/m³ (Rat) 4 h
Pentane (mixed isomers) 78-78-4	-	-	450 mg/L (Mouse) 2 h
Butane (mixed isomers) 106-97-8	-	-	658 mg/L (Rat) 4 h
Hexane Isomers (other than n-Hexane) 107-83-5	> 5000 mg/kg (Rat)	-	-
Toluene 108-88-3	> 2000 mg/kg (Rat)	8390 mg/kg (Rabbit)	12.5 mg/L (Rat) 4 h
Xylene (mixed isomers) 1330-20-7	> 2000 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	> 5.04 mg/L (Rat) 4 h
n-Hexane 110-54-3	15000 mg/kg (Rat)	3000 mg/kg (Rabbit)	48000 ppm (Rat) 4 h
Cumene 98-82-8	> 2000 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	> 20 mg/L (Rat) 6 h
1,2,4 Trimethylbenzene 95-63-6	3280 mg/kg (Rat)	> 3160 mg/kg (Rabbit)	18,000 mg/m³ (Rat) 4 h
Ethylbenzene 100-41-4	> 2000 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	17.2 mg/L (Rat) 4 h
Benzene 71-43-2	> 2000 mg/kg (Rat)	> 5000 mg/kg (Rabbit)	> 20 mg/l (Rat) 4 h
Cyclohexane 110-82-7	> 5000 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	13.9 mg/L (Rat) 4 h
Octane 111-65-9	-	-	118 g/m³ (Rat) 4 h
1,2,3-trimethylbenzene 526-73-8	-	-	-
Naphthalene 91-20-3	490 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	> 340 mg/m³ (Rat) 1 h

Delayed and immediate effects as well as chronic effects from short and long-term exposure

NAPHTHAS: In a large epidemiological study on over 15,000 employees at several petroleum refineries and amongst residents located near these refineries, no increased risk of kidney cancer was observed in association with gasoline exposures (a similar material). In a similar study, no increased risk of kidney cancer was observed among petroleum refinery workers, but there was a slight trend in the incidence of kidney cancers among service station employees, especially after a 30-year latency period. Altered mental state, drowsiness, peripheral motor neuropathy, irreversible brain damage (so-called Petrol Sniffer's Encephalopathy), delirium, seizures, and sudden death have been reported from repeated overexposure to some hydrocarbon solvents, naphthas, and gasoline.

ISOPARAFFINS: Studies in laboratory animals have shown that long-term exposure to similar materials (isoparaffins) can cause kidney damage and kidney cancer in male laboratory rats. However, in-depth research indicates that these findings are unique to the male rat, and that these effects are not relevant to humans.

C9 AROMATIC HYDROCARBONS: A developmental inhalation study was conducted in laboratory mice. Increased implantation losses, reduced fetal weights, delayed ossification and an increased incidence of cleft palate were observed at the highest exposure level (1,500 ppm). This exposure level was extremely toxic to pregnant female mice (44% mortality). Reduced fetal body weights were also observed at 500 ppm. A multi-generation reproduction inhalation study was conducted in laboratory rats. Reductions in pup weights, pup weight gain, litter size, and pup survival were observed at 1,500 ppm, an exposure level at which significant maternal toxicity was observed. Reduced pup weight gain was also observed at 500 ppm.

PENTANES: Studies of pentane isomers in laboratory animals indicate exposure to extremely high levels (roughly 10 vol.%) may induce cardiac arrhythmias (irregular heartbeats) which may be serious or fatal.

BUTANES: Studies in laboratory animals indicate exposure to extremely high levels of butanes (1-10 or higher vol.% in air) may cause cardiac arrhythmias (irregular heartbeats) which may be serious or fatal.

TOLUENE: Case studies of persons abusing toluene suggest isolated incidences of adverse effects on the fetus including birth defects. Abuse of toluene at high concentrations (e.g., glue sniffing and solvent abuse) has been associated with adverse effects on the liver, kidney and nervous system, and can cause CNS depression, cardiac arrhythmias, and death. Studies of workers indicate longterm exposure may be related to impaired color vision and hearing. Some studies of workers suggest longterm exposure may be related to neurobehavioral and cognitive changes. Some of these effects have been observed in laboratory animals following repeated exposure to high levels of toluene. Several studies of workers suggest longterm exposure may be related to small increases in spontaneous abortions and changes in some gonadotropic hormones. However, the weight of evidence does not indicate toluene is a reproductive hazard to humans. Studies in laboratory animals indicate some changes in reproductive organs following high levels of exposure, but no significant effects on mating performance or reproduction were observed. Case studies of persons abusing toluene suggest isolated incidences of adverse effects on the fetus including birth defects. Findings in laboratory animals have been largely negative. Positive findings include small increases in minor skeletal and visceral malformations and developmental delays following very high levels of maternal exposure. Studies of workers indicate long-term exposure may be related to effects on the liver, kidney and blood, but these appear to be limited to changes in serum enzymes and decreased leukocyte counts. Adverse effects on the liver, kidney, thymus and nervous system were observed in animal studies following very high levels of exposure. The relevance of these findings to humans is not clear at this time.

XYLENES, ALL ISOMERS: Overexposure to xylene may cause upper respiratory tract irritation, headache, cyanosis, blood serum changes, nervous system damage and narcosis. Effects may be increased by the use of alcoholic beverages. Evidence of liver and kidney impairment were reported in workers recovering from a gross overexposure. Effects from Prolonged or Repeated Exposure: Impaired neurological function was reported

in workers exposed to solvents including xylene. Studies in laboratory animals have shown evidence of impaired hearing following high levels of exposure. Studies in laboratory animals suggest some changes in reproductive organs following high levels of exposure but no significant effects on reproduction were observed. Studies in laboratory animals indicate skeletal and visceral malformations, developmental delays, and increased fetal resorptions following extremely high levels of maternal exposure with evidence of maternal toxicity. The relevance of these observations to humans is not clear at this time. Adverse effects on the liver, kidney, bone marrow (changes in blood cell parameters) were observed in laboratory animals following high levels of exposure. The relevance of these observations to humans is not clear at this time.

1,2,4-TRIMETHYLBENZENE: The following information pertains to a mixture of C9 aromatic hydrocarbons, over 40% of which was composed of 1,2,4-trimethylbenzene. A developmental inhalation study was conducted in laboratory mice. Increased implantation losses, reduced fetal weights, delayed ossification and an increased incidence of cleft palate were observed at the highest exposure level (1,500 ppm). This exposure level was extremely toxic to pregnant female mice (44% mortality). Reduced fetal body weights were also observed at 500 ppm. A multi-generation reproduction inhalation study was conducted in laboratory rats. Reductions in pup weights, pup weight gain, litter size, and pup survival were observed at 1,500 ppm, an exposure level at which significant maternal toxicity was observed. Reduced pup weight gain was also observed at 500 ppm. Embryotoxicity has been reported in studies of laboratory animals. Adverse effects included increased implantation losses, reduced fetal weights, delayed ossification and an increased incidence of cleft palate.<n><n>

N-HEXANE: Long-term or repeated exposure to n-hexane can cause peripheral nerve damage. Initial symptoms are numbness of the fingers and toes. Also, motor weakness can occur in the digits, but may also involve muscles of the arms, thighs and forearms. The onset of these symptoms may be delayed for several months to a year after the beginning of exposure. Testicular atrophy and partial to full loss of the germ cell line were observed in sub-chronic high-dose inhalation studies of laboratory rodents. These effects appeared irreversible. Rodent reproduction studies have shown evidence of reduced fetal weight but no frank malformations.

CUMENE: Overexposure to cumene may cause upper respiratory tract irritation and CNS depression. Studies in laboratory animals indicate evidence of respiratory tract hyperplasia, and adverse effects on the liver, kidney and adrenal glands following high level exposure. The relevance of these findings to humans is not clear at this time. Findings from lifetime laboratory rodent inhalation studies were as follows: In F344/N rats: an increased incidence of renal carcinomas and adenomas, respiratory epithelial adenomas, and interstitial cell adenomas of the testes. In B6C3F1 mice: an increased incidence of carcinomas and adenomas of the bronchi and lung, liver neoplasms, hemangiosarcomas of the spleen, and adenomas of the thyroid.

ETHYLBENZENE: Findings from a 2-year inhalation study in rodents conducted by NTP were as follows: Effects were observed only at the highest exposure level (750 ppm). At this level the incidence of renal tumors was elevated in male rats (tubular carcinomas) and female rats (tubular adenomas). The incidence of tumors was also elevated in male mice (alveolar and bronchiolar carcinomas) and female mice (hepatocellular carcinomas). IARC has classified ethyl benzene as "possibly carcinogenic to humans" (Group 2B). Studies in laboratory animals indicate some evidence of post-implantation deaths following high levels of maternal exposure. The relevance of these findings to humans is not clear at this time. Studies in laboratory animals indicate limited evidence of renal malformations, resorptions, and developmental delays following high levels of maternal exposure with evidence of maternal toxicity. The relevance of these findings to humans is not clear at this time. Studies in laboratory animals have demonstrated evidence of ototoxicity (hearing loss) following exposure levels as low as 300 ppm for 5 days. Studies in laboratory animals indicate some evidence of adverse effects on the liver, kidney, thyroid, and pituitary gland.

BENZENE: Studies of workers exposed to benzene show clear evidence that overexposure can cause cancer and other diseases of the blood forming organs including Acute

Myelogenous Leukemia (AML), and Aplastic Anemia (AA), an often fatal disease. Some studies suggest overexposure to benzene may also be associated with Myelodysplastic Syndrome (MDS). Findings from a case control study of workers exposed to benzene was reported during the 2009 Benzene Symposium in Munich included an increase in Acute Myeloid Leukemias and Non-Hodgkins Lymphoid Neoplasms (NHLN) of the subtype follicular lymphoma (FL) in some occupational categories. Some studies of workers exposed to benzene have shown an association with increased rates of chromosome aberrations in circulating lymphocytes. One study of women workers exposed to benzene suggested a weak association with irregular menstruation. However, other studies of workers exposed to benzene have not demonstrated clear evidence of an effect on fertility or reproductive outcome in humans. Benzene can cross the placenta and affect the developing fetus. Cases of AA have been reported in the offspring of persons severely overexposed to benzene. Studies in laboratory animals indicate that prolonged, repeated exposure to high levels of benzene vapor can cause bone marrow suppression and cancer in multiple organ systems. Studies in laboratory animals show evidence of adverse effects on male reproductive organs following high levels of exposure but no significant effects on reproduction have been observed. Embryotoxicity has been reported in studies of laboratory animals but effects were limited to reduced fetal weight and minor skeletal variations. Benzene has been classified as a proven human carcinogen by OSHA and a Group 1 (Carcinogenic to Humans) material by IARC. The current proposed IARC classification for benzene is summarized as follows: Sufficient evidence for Acute Myeloid Leukemia; limited evidence for Acute Lymphatic Leukemia, Chronic Lymphatic Leukemia, Non-Hodgkin Lymphoma, and Multiple Myeloma.

NAPHTHALENE: Severe jaundice, neurotoxicity (kernicterus) and fatalities have been reported in young children and infants as a result of hemolytic anemia from overexposure to naphthalene. Persons with glucose 6-phosphate dehydrogenase (G6PD) deficiency are more prone to the hemolytic effects of naphthalene. Adverse effects on the kidney have been reported in persons overexposed to naphthalene but these effects are believed to be a consequence of hemolytic anemia, and not a direct effect. Hemolytic anemia has been observed in laboratory animals exposed to naphthalene. Laboratory rodents exposed to naphthalene vapor for 2 years (lifetime studies) developed non-neoplastic and neoplastic tumors and inflammatory lesions of the nasal and respiratory tract. Cataracts and other adverse effects on the eye have been observed in laboratory animals exposed to high levels of naphthalene. Findings from a large number of bacterial and mammalian cell mutation assays have been negative. A few studies have shown chromosomal effects (elevated levels of Sister Chromatid Exchange or chromosomal aberrations) in vitro. Naphthalene has been classified as Possibly Carcinogenic to Humans (2B) by IARC, based on findings from studies in laboratory animals.

CARBON MONOXIDE: is a chemical asphyxiant with no warning properties (such as odor). At 400-500 ppm for 1 hour headache and dyspnea may occur. If activity is increased, symptoms of overexposure may include nausea, irritability, increased respiration, tinnitus, sweating, chest pain, confusion, impaired judgement, dizziness, weakness, drowsiness, ataxia, irregular heart beat, cyanosis and pallor. Levels in excess of 1000 ppm can result in collapse, loss of conciousness, respiratory failure and death. Extremely high concentrations (12,800 ppm) can cause immediate unconsciousness and death in 1-3 minutes. Repeated anoxia can lead to central nervous system damage and peripheral neuropathy, with loss of sensation in the fingers, amnesia, and mental deterioration and possible congestive heart failure. Damage may also occur to the fetus, lung, liver, kidney, spleen, cardiovascular system and other organs.

WHOLLY-VAPORIZED UNLEADED GASOLINE: Lifetime exposure to wholly vaporized unleaded gasoline produced an increased incidence of liver tumors in female mice exposed to the highest exposure concentration (2056 ppm) and α-2 urinary globulin-mediated kidney tumors in male rats. No exposure-related tumors were observed in male mice or female rats. The male-specific rat kidney tumors are not considered relevant to human health. Mice receiving lifetime repeated skin application of various petroleum naphthas exhibited an irritation-dependent increased incidence of skin tumors. Additional studies suggest that these tumors occur through a mechanism that may not be relevant to human health. Epidemiological data from over 18,000 petroleum marketing and distribution workers

showed no increased risk of leukemia, multiple myeloma, or kidney cancer resulting from gasoline exposure. Unleaded gasoline has been identified as possibly carcinogenic to humans (2B) by the International Agency for Research on Cancer (IARC).

COMBUSTION ENGINE EXHAUST: Chronic inhalation studies of gasoline engine exhaust in mice, rats and hamsters did not produce any carcinogenic effects. Condensates/extracts of gasoline engine exhaust produced an increase in tumors compared to controls when testing by skin painting, subcutaneous injection, intratracheal instillation or implantation into the lungs. Gasoline exhaust has been classified as possibly carcinogenic to humans (2B) by the International Agency for Research on Cancer (IARC).

Adverse effects related to the physical, chemical and toxicological characteristics

Signs and Symptoms Irritating to the skin and mucous membranes. Symptoms may include redness, itching, and inflammation. May cause nausea, vomiting, diarrhea, and signs of nervous system depression: headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue. Aspiration hazard. May cause coughing, chest pains, shortness of breath, pulmonary edema and/or chemical pneumonitis. Repeated or prolonged skin contact may cause drying, reddening, itching and cracking.

Sensitization Not expected to be a skin or respiratory sensitizer.

Mutagenic effects May cause genetic defects.

Carcinogenicity May cause cancer.

Cancer designations are listed in the table below

Name	ACGIH (Class)	IARC (Class)	NTP	OSHA
Gasoline 86290-81-5	Confirmed animal carcinogen (A3)	Possible human carcinogen (2B)	Not Listed	Not Listed
Heptane (mixed isomers) 142-82-5	Not Listed	Not Listed	Not Listed	Not Listed
Pentane (mixed isomers) 78-78-4	Not Listed	Not Listed	Not Listed	Not Listed
Butane (mixed isomers) 106-97-8	Not Listed	Not Listed	Not Listed	Not Listed
Hexane Isomers (other than n-Hexane) 107-83-5	Not Listed	Not Listed	Not Listed	Not Listed
Toluene 108-88-3	Not Classifiable (A4)	Not Classifiable (3)	Not Listed	Not Listed
Xylene (mixed isomers) 1330-20-7	Not classifiable (A4)	Not classifiable (3)	Not Listed	Not Listed
n-Hexane 110-54-3	Not Listed	Not Listed	Not Listed	Not Listed
Cumene 98-82-8	Not listed	Possible human carcinogen (2B)	Reasonably anticipated to be a human carcinogen	Not listed
1,2,4 Trimethylbenzene 95-63-6	Not Listed	Not Listed	Not Listed	Not Listed
Ethylbenzene 100-41-4	Confirmed animal carcinogen (A3)	Possible human carcinogen (2B)	Not Listed	Not Listed
Benzene 71-43-2	Confirmed human carcinogen (A1)	Carcinogenic to humans (1)	Known to be human carcinogen	Known carcinogen
Cyclohexane 110-82-7	Not Listed	Not Listed	Not Listed	Not Listed
Octane 111-65-9	Not Listed	Not Listed	Not Listed	Not Listed
1,2,3-trimethylbenzene 526-73-8	Not Listed	Not Listed	Not Listed	Not Listed
Naphthalene 91-20-3	Confirmed animal carcinogen (A3)	Possible human carcinogen (2B)	Reasonably anticipated to be a human carcinogen	Not Listed

Reproductive toxicity Suspected of damaging fertility or the unborn child.

Specific Target Organ Toxicity (STOT) - single exposure Respiratory system. Central nervous system.

Specific Target Organ Toxicity (STOT) - repeated exposure Not classified.

Aspiration hazard May be fatal if swallowed or vomited and enters airways.

12. ECOLOGICAL INFORMATION

Ecotoxicity This product should be considered toxic to aquatic organisms, with the potential to cause long lasting adverse effects in the aquatic environment.

Name	Algae/aquatic plants	Fish	Toxicity to Microorganisms	Crustacea
Gasoline 86290-81-5	72-hr EC50 = 56 mg/l Algae	96-hr LC50 = 11 mg/l Rainbow trout (static)	-	48-hr LC50 = 7.6 mg/l Daphnia magna
Heptane (mixed isomers) 142-82-5	-	96-hr LC50 = 375 mg/L Tilapia	-	-
Pentane (mixed isomers) 78-78-4	-	96-hr LC50 = 3.1 mg/L Rainbow trout	-	48-hr EC50 = >1 - <10 mg/L Daphnia magna
Butane (mixed isomers) 106-97-8	-	-	-	-
Hexane Isomers (other than n-Hexane) 107-83-5	-	-	-	-
Toluene 108-88-3	72-hr EC50 = 12.5 mg/l Algae	96-hr LC50 <= 10 mg/l Rainbow trout	-	48-hr EC50 = 5.46-9.83 mg/l Daphnia magna 48-hr EC50 = 11.5 mg/l Daphnia magna (Static)
Xylene (mixed isomers) 1330-20-7	72-hr EC50 = 11 mg/l Algae	96-hr LC50 = 8 mg/l Rainbow trout	-	48-hr LC50 = 3.82 mg/l Daphnia magna
n-Hexane 110-54-3	-	96-hr LC50 = 2.5 mg/l Fathead minnow	-	-
Cumene 98-82-8	72-hr EC50 = 2.6 mg/l Algae	96-hr LC50 = 6.04-6.61 mg/l Fathead minnow (Flow-through) 96-hr LC50 = 2.7 mg/l Rainbow trout (semi-static)	-	48-hr EC50 = 7.9-14.1 mg/l Daphnia magna (static)
1,2,4 Trimethylbenzene 95-63-6	-	96-hr LC50 = 7.19-8.28 mg/l Fathead minnow (flow-through)	-	48-hr EC50 = 6.14 mg/L Daphnia magna
Ethylbenzene 100-41-4	72-hr EC50 = 1.7-7.6 mg/l Algae	96-hr LC50 = 4 mg/L Rainbow trout	-	48-hr EC50 = 1-4 mg/L Daphnia magna
Benzene 71-43-2	72-hr EC50 = 29 mg/l Algae	96-hr LC50 = 5.3 mg/l Rainbow trout (flow-through)	-	48-hr EC50 = 8.76-15.6 mg/l Daphnia magna (Static)
Cyclohexane 110-82-7	72-hr EC50 = 500 mg/l Algae	96-hr LC50 = 3.96-5.18 mg/l Fathead minnow	-	48-hr EC50 = 1.7-3.5 mg/L Bay shrimp
Octane 111-65-9	-	-	-	48-hr LC50 = 0.38 mg/l Daphnia magna
1,2,3-trimethylbenzene 526-73-8	-	96-hr LC50 = 7.72 mg/l Fathead Minnow (flow-through)	-	-
Naphthalene 91-20-3	-	96-hr LC50 = 0.91-2.82 mg/l Rainbow trout (static) 96-hr LC50 = 1.99 mg/l Fathead minnow (static)	-	48-hr LC50 = 1.6 mg/l Daphnia magna

Persistence and degradability Expected to be inherently biodegradable. The presence of ethanol in this product may impede the biodegradation of benzene, toluene, ethylbenzene and xylene in groundwater, resulting in elongated plumes of these constituents.

Bioaccumulation Has the potential to bioaccumulate.

Mobility in soil May partition into air, soil and water.

Other adverse effects No information available.

13. DISPOSAL CONSIDERATIONS

Description of Waste Residues
This material may be a flammable liquid waste.

Safe Handling of Wastes
Handle in accordance with applicable local, state, and federal regulations. Use personal protection measures as required. Use appropriate grounding and bonding practices. Use only non-sparking tools. Do not expose to heat, open flames, strong oxidizers or other sources of ignition. No smoking.

Disposal of Wastes / Methods of Disposal
The user is responsible for determining if any discarded material is a hazardous waste (40 CFR 262.11). Dispose of in accordance with federal, state and local regulations.

Methods of Contaminated Packaging Disposal
Empty containers should be completely drained and then discarded or recycled, if possible. Do not cut, drill, grind or weld on empty containers since explosive residues may be present. Dispose of in accordance with federal, state and local regulations.

14. TRANSPORT INFORMATION

DOT (49 CFR 172.101):

UN Proper Shipping Name:	Gasoline
UN/Identification No:	UN 1203
Transport Hazard Class(es):	3
Packing Group:	II

TDG (Canada):

UN Proper Shipping Name:	Gasoline
UN/Identification No:	UN 1203
Transport Hazard Class(es):	3
Packing Group:	II

15. REGULATORY INFORMATION

US Federal Regulatory Information:

US TSCA Chemical Inventory Section 8(b): This product and/or its components are listed on the TSCA Chemical Inventory.

EPA Superfund Amendment & Reauthorization Act (SARA):

SARA Section 302: This product does not contain any component(s) included on EPA's Extremely Hazardous Substance (EHS) List.

Name	CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs
Gasoline	NA
Heptane (mixed isomers)	NA
Pentane (mixed isomers)	NA
Butane (mixed isomers)	NA
Hexane Isomers (other than n-Hexane)	NA
Toluene	NA
Xylene (mixed isomers)	NA

n-Hexane	NA
Cumene	NA
1,2,4 Trimethylbenzene	NA
Ethylbenzene	NA
Benzene	NA
Cyclohexane	NA
Octane	NA
1,2,3-trimethylbenzene	NA
Naphthalene	NA

SARA Section 304: This product may contain component(s) identified either as an EHS or a CERCLA Hazardous substance which in case of a spill or release may be subject to SARA reporting requirements:

Name	Hazardous Substances RQs
Gasoline	NA
Heptane (mixed isomers)	NA
Pentane (mixed isomers)	NA
Butane (mixed isomers)	NA
Hexane Isomers (other than n-Hexane)	NA
Toluene	1000 lb final RQ 454 kg final RQ
Xylene (mixed isomers)	100 lb final RQ 45.4 kg final RQ
n-Hexane	5000 lb final RQ 2270 kg final RQ
Cumene	5000 lb final RQ 2270 kg final RQ
1,2,4 Trimethylbenzene	NA
Ethylbenzene	1000 lb final RQ 454 kg final RQ
Benzene	10 lb final RQ 4.54 kg final RQ
Cyclohexane	1000 lb final RQ 454 kg final RQ
Octane	NA
1,2,3-trimethylbenzene	NA
Naphthalene	100 lb final RQ 45.4 kg final RQ

SARA: The following EPA hazard categories apply to this product:

Acute Health Hazard
Chronic Health Hazard
Fire Hazard

SARA Section 313: This product may contain component(s), which if in exceedance of the de minimus threshold, may be subject to the reporting requirements of SARA Title III Section 313 Toxic Release Reporting (Form R).

Name	CERCLA/SARA 313 Emission reporting:
Gasoline	None
Heptane (mixed isomers)	None
Pentane (mixed isomers)	None
Butane (mixed isomers)	None
Hexane Isomers (other than n-Hexane)	None
Toluene	1.0 % de minimis concentration
Xylene (mixed isomers)	1.0 % de minimis concentration
n-Hexane	1.0 % de minimis concentration
Cumene	1.0 % de minimis concentration

1,2,4 Trimethylbenzene	1.0 % de minimis concentration
Ethylbenzene	0.1 % de minimis concentration
Benzene	0.1 % de minimis concentration
Cyclohexane	1.0 % de minimis concentration
Octane	None
1,2,3-trimethylbenzene	None
Naphthalene	0.1 % de minimis concentration

State and Community Right-To-Know Regulations:
The following component(s) of this material are identified on the regulatory lists below:

Gasoline

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 0957
Pennsylvania Right-To-Know:	Present
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Not Listed
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Carcinogen; Flammable - third degree
New Jersey - Environmental Hazardous Substances List:	SN 0957 TPQ: 10000 lb (Under N.J.A.C. 7:1G, environmental hazardous substances in mixtures such as gasoline or new and used petroleum oil may be reported under these categories)
Illinois - Toxic Air Contaminants:	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

Heptane (mixed isomers)

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 1339
Pennsylvania Right-To-Know:	Present
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic; Flammable
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Flammable - third degree
New Jersey - Environmental Hazardous Substances List:	Not Listed
Illinois - Toxic Air Contaminants:	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

Pentane (mixed isomers)

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 1064
Pennsylvania Right-To-Know:	Present
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Not Listed
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed

California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Flammable - fourth degree
New Jersey - Environmental Hazardous Substances List:	SN 1064 TPQ: 500 lb
Illinois - Toxic Air Contaminants:	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

Butane (mixed isomers)

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 0273
Pennsylvania Right-To-Know:	Present
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic; Flammable
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Flammable - fourth degree
New Jersey - Environmental Hazardous Substances List:	SN 0273 TPQ: 500 lb
Illinois - Toxic Air Contaminants:	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

Hexane Isomers (other than n-Hexane)

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 1285
Pennsylvania Right-To-Know:	Present
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Not Listed
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Flammable - third degree
New Jersey - Environmental Hazardous Substances List:	Not Listed
Illinois - Toxic Air Contaminants:	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

Toluene

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Developmental toxicity, initial date 1/1/91 Female reproductive toxicity, initial date 8/7/09
New Jersey Right-To-Know:	SN 1866
Pennsylvania Right-To-Know:	Environmental hazard
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic (skin); Flammable (skin)
Michigan Critical Materials Register List:	100 lb Annual usage threshold
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed

New Jersey - Special Hazardous Substances:	Flammable - third degree; Teratogen
New Jersey - Environmental Hazardous Substances List:	SN 1866 TPQ: 500 lb
Illinois - Toxic Air Contaminants:	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	1000 lb RQ (air); 1 lb RQ (land/water)

Xylene (mixed isomers)

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 2014
Pennsylvania Right-To-Know:	Environmental hazard
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic (skin); Flammable (skin)
Michigan Critical Materials Register List:	100 lb Annual usage threshold all isomers
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Flammable - third degree
New Jersey - Environmental Hazardous Substances List:	SN 2014 TPQ: 500 lb
Illinois - Toxic Air Contaminants:	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	1000 lb RQ (air); 1 lb RQ (land/water)

n-Hexane

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 1340
Pennsylvania Right-To-Know:	Present
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic; Flammable
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Flammable - third degree
New Jersey - Environmental Hazardous Substances List:	SN 1340 TPQ: 500 lb
Illinois - Toxic Air Contaminants:	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	1 lb RQ (air); 1 lb RQ (land/water)

Cumene

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Carcinogen, initial date 4/6/10
New Jersey Right-To-Know:	SN 0542
Pennsylvania Right-To-Know:	Environmental hazard
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic (skin); Flammable (skin)
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Flammable - third degree
New Jersey - Environmental Hazardous Substances List:	SN 0542 TPQ: 500 lb
Illinois - Toxic Air Contaminants:	Present

New York - Reporting of Releases Part 597 - List of Hazardous Substances:	5000 lb RQ (air); 1 lb RQ (land/water)

1,2,4 Trimethylbenzene

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 1929
Pennsylvania Right-To-Know:	Present
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Not Listed
New Jersey - Environmental Hazardous Substances List:	Not Listed
Illinois - Toxic Air Contaminants:	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

Ethylbenzene

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Carcinogen, initial date 6/11/04
New Jersey Right-To-Know:	SN 0851
Pennsylvania Right-To-Know:	Environmental hazard
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic; Flammable
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Carcinogen; flammable - Third degree
New Jersey - Environmental Hazardous Substances List:	SN 0851 TPQ: 500 lb
Illinois - Toxic Air Contaminants:	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	1000 lb RQ (air); 1 lb RQ (land/water)

Benzene

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Carcinogen, initial date 2/27/87 Developmental toxicity, initial date 12/26/97 Male reproductive toxicity, initial date 12/26/97
New Jersey Right-To-Know:	SN 0197
Pennsylvania Right-To-Know:	Environmental hazard; Special hazardous substance
Massachusetts Right-To Know:	Carcinogen; Extraordinarily hazardous
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic (skin); Flammable (skin); Carcinogen (skin)
Michigan Critical Materials Register List:	100 lb Annual usage threshold
Massachusetts Extraordinarily Hazardous Substances:	Carcinogen; Extraordinarily hazardous
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Present
New Jersey - Special Hazardous Substances:	Carcinogen; Flammable - third degree; Mutagen
New Jersey - Environmental Hazardous Substances List:	SN 0197 TPQ: 500 lb
Illinois - Toxic Air Contaminants:	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	10 lb RQ (air); 1 lb RQ (land/water)

Cyclohexane

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 0565
Pennsylvania Right-To-Know:	Environmental hazard
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic; Flammable
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Flammable - third degree
New Jersey - Environmental Hazardous Substances List:	SN 0565 TPQ: 500 lb
Illinois - Toxic Air Contaminants:	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	1000 lb RQ (air); 1 lb RQ (land/water)

Octane

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 1434
Pennsylvania Right-To-Know:	Present
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic; Flammable
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Flammable - third degree
New Jersey - Environmental Hazardous Substances List:	Not Listed
Illinois - Toxic Air Contaminants:	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

1,2,3-trimethylbenzene

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 1929
Pennsylvania Right-To-Know:	Present
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Not Listed
New Jersey - Environmental Hazardous Substances List:	Not Listed
Illinois - Toxic Air Contaminants:	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

Naphthalene

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Carcinogen, initial date 4/19/02
New Jersey Right-To-Know:	SN 1322 SN 3758

Pennsylvania Right-To-Know:	Environmental hazard Present (particulate)
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic; Flammable
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Carcinogen
New Jersey - Environmental Hazardous Substances List:	SN 1322 TPQ: 500 lb (Reportable at the de minimis quantity of >0.1%)
Illinois - Toxic Air Contaminants:	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	100 lb RQ (air); 1 lb RQ (land/water)

Canada DSL/NDSL Inventory: This product and/or its components are listed either on the Domestic Substances List (DSL) or are exempt.

Canadian Regulatory Information: This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the (M)SDS contains all the information required by the Controlled Products Regulations.

Name	Canada - WHMIS: Classifications of Substances:	Canada - WHMIS: Ingredient Disclosure:
Gasoline	B2,D2A,D2B	0.1%
Heptane (mixed isomers)	B2,D2B	1%
Pentane (mixed isomers)	B2	1%
Butane (mixed isomers)	A,B1	1%
Hexane Isomers (other than n-Hexane)	B2	1%
Toluene	B2,D2A,D2B	0.1%
Xylene (mixed isomers)	B2,D2A,D2B	m-, o-isomers 1.0%; p-isomer 0.1%
n-Hexane	B2,D2A,D2B	1%
Cumene	B2,D2A	0.1%
1,2,4 Trimethylbenzene	B3,D2B	1%
Ethylbenzene	B2,D2A,D2B	0.1%
Benzene	B2,D2A,D2B	0.1%
Cyclohexane	B2,D2B	1%
Octane	B2,D2B	1%
1,2,3-trimethylbenzene	B3	1%
Naphthalene	B4,D2A	0.1%

Note: Not applicable.

16. OTHER INFORMATION

Prepared By Toxicology and Product Safety

Revision Date: 06/01/2016

Revision Note:

Revised Sections

The following sections (§) have been updated:
1. IDENTIFICATION
2. HAZARD IDENTIFICATION
3. COMPOSITION/INFORMATION ON INGREDIENTS
4. FIRST AID MEASURES
6. ACCIDENTAL RELEASE MEASURES
7. HANDLING AND STORAGE
8. EXPOSURE CONTROLS/PERSONAL PROTECTION
9. PHYSICAL AND CHEMICAL PROPERTIES
11. TOXICOLOGICAL INFORMATION
12. ECOLOGICAL INFORMATION
15. REGULATORY INFORMATION

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information is intended as guidance for safe handling, use, processing, storage, transportation, accidental release, clean-up and disposal and is not considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

SAFETY DATA SHEET

Helium

Section 1. Identification

GHS product identifier : Helium

Chemical name : Helium

Other means of identification : helium (dot); Helium-4; He; o-Helium; UN 1046

Product use : Synthetic/Analytical chemistry.

Synonym : helium (dot); Helium-4; He; o-Helium; UN 1046

SDS # : 001025

Supplier's details : Airgas USA, LLC and its affiliates
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253

Emergency telephone number (with hours of operation) : 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : GASES UNDER PRESSURE - Compressed gas

GHS label elements

Hazard pictograms :

Signal word : Warning

Hazard statements : Contains gas under pressure; may explode if heated.
May displace oxygen and cause rapid suffocation.

Precautionary statements

General : Read and follow all Safety Data Sheets (SDS'S) before use. Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Use a back flow preventative device in the piping. Use only equipment of compatible materials of construction.

Prevention : Use and store only outdoors or in a well ventilated place.

Response : Not applicable.

Storage : Protect from sunlight. Protect from sunlight when ambient temperature exceeds 52°C/125°F. Store in a well-ventilated place.

Disposal : Not applicable.

Hazards not otherwise classified : In addition to any other important health or physical hazards, this product may displace oxygen and cause rapid suffocation.

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Section 3. Composition/information on ingredients

Substance/mixture : Substance

Chemical name : Helium

Other means of identification : helium (dot); Helium-4; He; o-Helium; UN 1046

CAS number/other identifiers

CAS number : 7440-59-7

Product code : 001025

Ingredient name	%	CAS number
Helium	100	7440-59-7

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : As this product is a gas, refer to the inhalation section.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Contact with rapidly expanding gas may cause burns or frostbite.

Inhalation : No known significant effects or critical hazards.

Skin contact : Contact with rapidly expanding gas may cause burns or frostbite.

Frostbite : Try to warm up the frozen tissues and seek medical attention.

Ingestion : As this product is a gas, refer to the inhalation section.

Over-exposure signs/symptoms

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

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Section 4. First aid measures

Specific treatments : No specific treatment.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode.

Hazardous thermal decomposition products : No specific data.

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Immediately contact emergency personnel. Stop leak if without risk.

Large spill : Immediately contact emergency personnel. Stop leak if without risk. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

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Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Avoid contact with eyes, skin and clothing. Avoid breathing gas. Empty containers retain product residue and can be hazardous. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Keep container tightly closed and sealed until ready for use. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Helium	Oxygen Depletion [Asphyxiant]

Appropriate engineering controls : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

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Section 8. Exposure controls/personal protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state : Gas. [Compressed gas.]

Color : Colorless.

Molecular weight : 4 g/mole

Molecular formula : He

Boiling/condensation point : -268.9°C (-452°F)

Melting/freezing point : -272.2°C (-458°F)

Critical temperature : -267.9°C (-450.2°F)

Odor : Odorless.

Odor threshold : Not available.

pH : Not available.

Flash point : [Product does not sustain combustion.]

Burning time : Not applicable.

Burning rate : Not applicable.

Evaporation rate : Not available.

Flammability (solid, gas) : Not available.

Lower and upper explosive (flammable) limits : Not available.

Vapor pressure : Not available.

Vapor density : 0.14 (Air = 1) Liquid Density@BP: 7.8 lb/ft3 (125 kg/m3)

Specific Volume (ft^3/lb) : 96.1538

Gas Density (lb/ft^3) : 0.0104

Relative density : Not applicable.

Solubility : Not available.

Solubility in water : Not available.

Partition coefficient: n-octanol/water : 0.28

Auto-ignition temperature : Not available.

Decomposition temperature : Not available.

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Section 9. Physical and chemical properties

SADT : Not available.

Viscosity : Not applicable.

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : No specific data.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Not available.

Irritation/Corrosion

Not available.

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

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Section 11. Toxicological information

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : Contact with rapidly expanding gas may cause burns or frostbite.

Inhalation : No known significant effects or critical hazards.

Skin contact : Contact with rapidly expanding gas may cause burns or frostbite.

Ingestion : As this product is a gas, refer to the inhalation section.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

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Section 12. Ecological information

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Helium	0.28	-	low

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Empty Airgas-owned pressure vessels should be returned to Airgas. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN1046	UN1046	UN1046	UN1046	UN1046
UN proper shipping name	HELIUM, COMPRESSED	HELIUM, COMPRESSED	HELIUM, COMPRESSED	HELIUM, COMPRESSED	HELIUM, COMPRESSED
Transport hazard class(es)	2.2	2.2	2.2	2.2	2.2
Packing group	-	-	-	-	-
Environment	No.	No.	No.	No.	No.
Additional information	**Limited quantity** Yes. **Packaging instruction** **Passenger aircraft** Quantity limitation: 75 kg **Cargo aircraft** Quantity limitation: 150 kg	**Explosive Limit and Limited Quantity Index** 0.125 **Passenger Carrying Road or Rail Index** 75	-	-	**Passenger and Cargo Aircraft**Quantity limitation: 75 kg **Cargo Aircraft Only** Quantity limitation: 150 kg

"Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product."

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Section 14. Transport information

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption**: Not determined

United States inventory (TSCA 8b): This material is listed or exempted.

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Sudden release of pressure

Composition/information on ingredients

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
Helium	100	No.	Yes.	No.	No.	No.

State regulations

Massachusetts : This material is listed.

New York : This material is not listed.

New Jersey : This material is listed.

Pennsylvania : This material is listed.

Canada inventory : This material is listed or exempted.

International regulations

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Section 15. Regulatory information

International lists : **Australia inventory (AICS)**: This material is listed or exempted.
China inventory (IECSC): This material is listed or exempted.
Japan inventory: Not determined.
Korea inventory: This material is listed or exempted.
Malaysia Inventory (EHS Register): Not determined.
New Zealand Inventory of Chemicals (NZIoC): This material is listed or exempted.
Philippines inventory (PICCS): This material is listed or exempted.
Taiwan inventory (CSNN): Not determined.

Chemical Weapons Convention List Schedule I Chemicals : Not listed

Chemical Weapons Convention List Schedule II Chemicals : Not listed

Chemical Weapons Convention List Schedule III Chemicals : Not listed

Canada

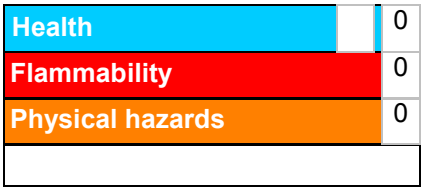
WHMIS (Canada) : Class A: Compressed gas.

CEPA Toxic substances: This material is not listed.
Canadian ARET: This material is not listed.
Canadian NPRI: This material is not listed.
Alberta Designated Substances: This material is not listed.
Ontario Designated Substances: This material is not listed.
Quebec Designated Substances: This material is not listed.

Section 16. Other information

Canada Label requirements : Class A: Compressed gas.

Hazardous Material Information System (U.S.A.)



Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on SDSs under 29 CFR 1910. 1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)

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Section 16. Other information

Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

History

Date of printing : 10/15/2014.

Date of issue/Date of revision : 10/15/2014.

Date of previous issue : 10/2/2014.

Version : 0.02

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United NationsACGIH – American Conference of Governmental Industrial Hygienists
AIHA – American Industrial Hygiene Association
CAS – Chemical Abstract Services
CEPA – Canadian Environmental Protection Act
CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act (EPA)
CFR – United States Code of Federal Regulations
CPR – Controlled Products Regulations
DSL – Domestic Substances List
GWP – Global Warming Potential
IARC – International Agency for Research on Cancer
ICAO – International Civil Aviation Organisation
Inh – Inhalation
LC – Lethal concentration
LD – Lethal dosage
NDSL – Non-Domestic Substances List
NIOSH – National Institute for Occupational Safety and Health
TDG – Canadian Transportation of Dangerous Goods Act and Regulations
TLV – Threshold Limit Value
TSCA – Toxic Substances Control Act
WEEL – Workplace Environmental Exposure Level
WHMIS – Canadian Workplace Hazardous Material Information System

References : Not available.

Indicates information that has changed from previously issued version.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

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SAFETY DATA SHEET

Version 5.3
Revision Date 04/24/2015
Print Date 04/02/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Heptachlor epoxide

Product Number : 49042
Brand : Supelco
Index-No. : 602-063-00-5

CAS-No. : 1024-57-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 2), H300
Carcinogenicity (Category 2), H351
Specific target organ toxicity - repeated exposure (Category 2), H373
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H300 Fatal if swallowed.
H351 Suspected of causing cancer.
H373 May cause damage to organs through prolonged or repeated exposure.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.

P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.
P281	Use personal protective equipment as required.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician. Rinse mouth.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : Heptachlor exo-epoxide
HCE
exo-1,4,5,6,7,8,8-Heptachloro-2,3-epoxy-4,7-methano-3a,4,7,7a-tetrahydroindane

Formula : $C_{10}H_5Cl_7O$
Molecular weight : 389.32 g/mol
CAS-No. : 1024-57-3
EC-No. : 213-831-0
Index-No. : 602-063-00-5

Hazardous components

Component	Classification	Concentration
Heptachlor epoxide		
	Acute Tox. 2; Carc. 2; STOT RE 2; Aquatic Acute 1; Aquatic Chronic 1; H300, H351, H373, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

Recommended storage temperature 2 - 8 °C
Storage class (TRGS 510): Non-combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Heptachlor epoxide	1024-57-3	TWA	0.05 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Liver damage Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption		

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	157.0 - 161.0 °C (314.6 - 321.8 °F)
f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
h)	Evaporation rate	No data available

i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	log Pow: 5.40
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Bulk density	1,100 kg/m3

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 15.0 mg/kg

Inhalation: No data available

Dermal: No data available

LD50 Intracerebral - Mouse - 8 mg/kg
Remarks: Behavioral:Convulsions or effect on seizure threshold.

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Limited evidence of carcinogenicity in animal studies

IARC:	2B - Group 2B: Possibly carcinogenic to humans (Heptachlor epoxide)
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: PB9450000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Blood -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 0.02 mg/l - 96.0 h
Toxicity to daphnia and other aquatic invertebrates	LC50 - Daphnia magna (Water flea) - 0.24 mg/l - 48 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
Bioaccumulation: Pimephales promelas (fathead minnow) - 32 d - 0.0013 mg/l

Bioconcentration factor (BCF): 14,400

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 2811 Class: 6.1 Packing group: II
Proper shipping name: Toxic solids, organic, n.o.s. (Heptachlor epoxide)
Reportable Quantity (RQ): 1 lbs
Marine pollutant:yes
Poison Inhalation Hazard: No

IMDG

UN number: 2811 Class: 6.1 Packing group: II EMS-No: F-A, S-A
Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. (Heptachlor epoxide)

IATA

UN number: 2811 Class: 6.1 Packing group: II
Proper shipping name: Toxic solid, organic, n.o.s. (Heptachlor epoxide)

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Heptachlor epoxide	1024-57-3	1994-04-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Heptachlor epoxide	1024-57-3	1994-04-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Heptachlor epoxide	1024-57-3	1994-04-01

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer. Heptachlor epoxide	1024-57-3	2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
H300	Fatal if swallowed.
H351	Suspected of causing cancer.
H373	May cause damage to organs through prolonged or repeated exposure.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	4
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	3
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.3 Revision Date: 04/24/2015 Print Date: 04/02/2016

SAFETY DATA SHEET

Version 5.7
Revision Date 11/03/2015
Print Date 02/18/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Heptane

Product Number : 246654
Brand : Sigma-Aldrich
Index-No. : 601-008-00-2

CAS-No. : 142-82-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 2), H225
Skin irritation (Category 2), H315
Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336
Aspiration hazard (Category 1), H304
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H225 Highly flammable liquid and vapour.
H304 May be fatal if swallowed and enters airways.
H315 Causes skin irritation.
H336 May cause drowsiness or dizziness.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.

P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ eye protection/ face protection.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P312	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P331	Do NOT induce vomiting.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	C_7H_{16}
Molecular weight	:	100.20 g/mol
CAS-No.	:	142-82-5
EC-No.	:	205-563-8
Index-No.	:	601-008-00-2
Registration number	:	01-2119457603-38-XXXX

Hazardous components

Component	Classification	Concentration
Heptane		
	Flam. Liq. 2; Skin Irrit. 2; STOT SE 3; Asp. Tox. 1; Aquatic Acute 1; Aquatic Chronic 1; H225, H304, H315, H336, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides
Flash back possible over considerable distance.

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion.Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Use explosion-proof equipment.Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store under inert gas. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): Flammable liquids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Heptane	142-82-5	TWA	85.000000 ppm 350.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		C	440.000000 ppm 1,800.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
	Remarks	15 minute ceiling value		
		TWA	500.000000 ppm 2,000.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		
		TWA	400.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation		
		STEL	500.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation		
		TWA	400.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation		
		STEL	500.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation		
		TWA	400 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation		
		STEL	500 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation		

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 480 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.2 mm
Break through time: 65 min
Material tested:Dermatril® P (KCL 743 / Aldrich Z677388, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -91 °C (-132 °F)
f)	Initial boiling point and boiling range	98 °C (208 °F)
g)	Flash point	-3.99 °C (24.82 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 7 %(V) Lower explosion limit: 1.1 %(V)
k)	Vapour pressure	110.7 hPa (83.0 mmHg) at 37.7 °C (99.9 °F) 53.3 hPa (40.0 mmHg) at 20.0 °C (68.0 °F)
l)	Vapour density	No data available

m)	Relative density	0.684 g/mL at 25 °C (77 °F)
n)	Water solubility	insoluble
o)	Partition coefficient: n-octanol/water	log Pow: > 3.000
p)	Auto-ignition temperature	223.0 °C (433.4 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Vapours may form explosive mixture with air.

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available

LC50 Inhalation - Rat - 4 h - 103,000 mg/m3

Inhalation: Irritating to respiratory system.

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation
(OECD Test Guideline 405)

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
May cause drowsiness or dizziness.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
May be fatal if swallowed and enters airways.

Additional Information
RTECS: MI7700000

Prolonged or repeated exposure to skin causes defatting and dermatitis., Central nervous system depression, narcosis, Damage to the lungs.

Stomach - Irregularities - Based on Human Evidence
Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Carassius auratus (goldfish) - 4 mg/l - 24.0 h
	LC50 - Tilapia mossambica - 375 mg/l - 96.0 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 1.50 mg/l - 48 h

12.2 Persistence and degradability

Ratio BOD/ThBOD	3.5 %

12.3 Bioaccumulative potential
Indication of bioaccumulation.

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

Do not empty into drains. Avoid release to the environment.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1206 Class: 3 Packing group: II
Proper shipping name: Heptanes
Reportable Quantity (RQ):
Marine pollutant:yes
Poison Inhalation Hazard: No

IMDG
UN number: 1206 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: HEPTANES
Marine pollutant:yes

IATA
UN number: 1206 Class: 3 Packing group: II
Proper shipping name: Heptanes

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Heptane	142-82-5	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Heptane	142-82-5	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Heptane	142-82-5	1993-04-24

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity

Asp. Tox.	Aspiration hazard
Flam. Liq.	Flammable liquids
H225	Highly flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H336	May cause drowsiness or dizziness.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
Skin Irrit.	Skin irritation

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	3
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	3
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.7 Revision Date: 11/03/2015 Print Date: 02/18/2016

SAFETY DATA SHEET

Version 3.8
Revision Date 04/24/2015
Print Date 04/01/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Hexachlorobenzene

Product Number : 171050
Brand : Aldrich
Index-No. : 602-065-00-6

CAS-No. : 118-74-1

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Carcinogenicity (Category 1B), H350
Specific target organ toxicity - repeated exposure, Oral (Category 1), H372
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H350 May cause cancer.
H372 Causes damage to organs through prolonged or repeated exposure if swallowed.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264 Wash skin thoroughly after handling.

P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.
P281	Use personal protective equipment as required.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	C_6Cl_6
Molecular weight	:	284.78 g/mol
CAS-No.	:	118-74-1
EC-No.	:	204-273-9
Index-No.	:	602-065-00-6

Hazardous components

Component	Classification	Concentration
Hexachlorobenzene		
	Carc. 1B; STOT RE 1; Aquatic Acute 1; Aquatic Chronic 1; H350, H372, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Keep in a dry place.
Storage class (TRGS 510): Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Hexachlorobenzene	118-74-1	TWA	0.002000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Central Nervous System impairment Porphyrin effects Skin damage Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption		

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder Colour: white
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 227 - 229 °C (441 - 444 °F) - lit.
f)	Initial boiling point and boiling range	323 - 326 °C (613 - 619 °F) - lit.
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available

m)	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 10,000 mg/kg

LD50 Oral - Mouse - 4,000 mg/kg

LD50 Oral - Cat - 1,700 mg/kg

LD50 Oral - Rabbit - 2,600 mg/kg

LD50 Oral - Guinea pig - > 3,000 mg/kg

LD50 Oral - Quail - > 6,400 mg/kg

LD50 Oral - Mammal - > 5,000 mg/kg
Remarks: Behavioral:Somnolence (general depressed activity). Behavioral:Change in motor activity (specific assay).

LC50 Inhalation - Rat - 3,600 mg/m3

LC50 Inhalation - Mouse - 4,000 mg/m3

LC50 Inhalation - Cat - 1,600 mg/m3

LC50 Inhalation - Rabbit - 1,800 mg/m3

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
Causes photosensitivity. Exposure to light can result in allergic reactions resulting in dermatologic lesions, which can vary from sunburnlike responses to edematous, vesiculated lesions, or bullae

Germ cell mutagenicity
No data available

Carcinogenicity

This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Possible human carcinogen

IARC:	2B - Group 2B: Possibly carcinogenic to humans (Hexachlorobenzene)
NTP:	Reasonably anticipated to be a human carcinogen (Hexachlorobenzene)
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
Ingestion - Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard
No data available

Additional Information
RTECS: Not available

Liver -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Lepomis macrochirus (Bluegill) - 7.6 mg/l - 96.0 h
	NOEC - Pimephales promelas (fathead minnow) - > 0.0048 mg/l - 96.0 h
Toxicity to daphnia and other aquatic invertebrates	Immobilization EC50 - Daphnia magna (Water flea) - > 0.005 mg/l - 48 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
Bioaccumulation: Pimephales promelas (fathead minnow) - 32 d - 0.0003 mg/l

Bioconcentration factor (BCF): 22,000

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 2729 Class: 6.1 Packing group: III
Proper shipping name: Hexachlorobenzene
Reportable Quantity (RQ): 10 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 2729 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: HEXACHLOROBENZENE
Marine pollutant:yes

IATA

UN number: 2729 Class: 6.1 Packing group: III
Proper shipping name: Hexachlorobenzene

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Hexachlorobenzene	118-74-1	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Hexachlorobenzene	118-74-1	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Hexachlorobenzene	118-74-1	2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer. Hexachlorobenzene	CAS-No. 118-74-1	Revision Date 2007-09-28
WARNING: This product contains a chemical known to the	CAS-No.	Revision Date

State of California to cause birth defects or other reproductive harm. Hexachlorobenzene	118-74-1	2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
H350	May cause cancer.
H372	Causes damage to organs through prolonged or repeated exposure if swallowed.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	3
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	3
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 3.8 Revision Date: 04/24/2015 Print Date: 04/01/2016

SAFETY DATA SHEET

Version 6.8
Revision Date 08/28/2024
Print Date 08/29/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Indeno[1,2,3-*cd*]pyrene

Product Number : 48499
Brand : Supelco
CAS-No. : 193-39-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Carcinogenicity (Category 2), H351

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal Word Warning

Hazard Statements
H351 Suspected of causing cancer.

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operates as MilliporeSigma in the US and Canada

Precautionary Statements

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	$C_{22}H_{12}$
Molecular weight	:	276.33 g/mol
CAS-No.	:	193-39-5
EC-No.	:	205-893-2

Component	Classification	Concentration
Indeno[1,2,3-cd]pyrene		
	Carc. 2; H351	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Call in physician.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

In case of eye contact
After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

If swallowed
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

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4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Water Foam Carbon dioxide (CO2) Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Carbon oxides
Combustible.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information
Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Avoid inhalation of dusts. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up dry. Dispose of properly. Clean up affected area. Avoid generation of dusts.

6.4 Reference to other sections
For disposal see section 13.

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SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Work under hood. Do not inhale substance/mixture.

Hygiene measures
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Dry. Keep locked up or in an area accessible only to qualified or authorized persons.

Storage class
Storage class (TRGS 510): 11: Combustible Solids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
Handle with impervious gloves.

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm

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Break through time: 480 min
Material tested:KCL 741 Dermatril® L

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

Body Protection
protective clothing

Respiratory protection
Recommended Filter type: Filter type P3
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when dusts are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odor	No data available
c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	163.6 °C (326.5 °F)
f)	Initial boiling point and boiling range	No data available
g)	Flash point	()Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Density	No data available

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	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Autoignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
The following applies in general to flammable organic substances and mixtures: in correspondingly fine distribution, when whirled up a dust explosion potential may generally be assumed.

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
Oral: No data available
Inhalation: No data available
Dermal: No data available

Skin corrosion/irritation
Remarks: No data available

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Serious eye damage/eye irritation
Remarks: No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity
This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Indeno[1,2,3-cd]pyrene)

NTP: RAHC - Reasonably anticipated to be a human carcinogen (Indeno[1,2,3-cd]pyrene)

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties
No data available

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operates as MilliporeSigma in the US and Canada

12.7 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)

Not dangerous goods

IMDG

Not dangerous goods

IATA

Not dangerous goods

Further information

Not classified as dangerous in the meaning of transport regulations.

SECTION 15: Regulatory information

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
Indeno[1,2,3-cd]pyrene	193-39-5	100	100

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Chronic Health Hazard

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SARA 313 : The following components are subject to reporting levels established by SARA Title III, Section 313:

Indeno[1,2,3-cd]pyrene	193-39-5	>= 90 - <= 100 %

US State Regulations

Massachusetts Right To Know

Indeno[1,2,3-cd]pyrene	193-39-5

Pennsylvania Right To Know

Indeno[1,2,3-cd]pyrene	193-39-5

Maine Chemicals of High Concern

Product does not contain any listed chemicals

Vermont Chemicals of High Concern

Product does not contain any listed chemicals

Washington Chemicals of High Concern

Product does not contain any listed chemicals

California Prop. 65

WARNING: This product can expose you to chemicals including Indeno[1,2,3-cd]pyrene, which is/are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

The ingredients of this product are reported in the following inventories:

TSCA : All substances listed as active on the TSCA inventory

TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Version 6.8
Revision Date 30.05.2024
Print Date 16.09.2024
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Iron
Product Number	:	12310
Brand	:	Aldrich
REACH No.	:	01-2119462838-24-XXXX
CAS-No.	:	7439-89-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Inc. 3050 SPRUCE ST ST. LOUIS MO 63103 UNITED STATES
Telephone	:	+1 314 771-5765
Fax	:	+1 800 325-5052

1.4 Emergency telephone

Emergency Phone #	:	800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Flammable solids, (Category 1)	H228: Flammable solid.
Self-heating substances and mixtures, (Category 1)	H251: Self-heating; may catch fire.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008

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Pictogram	
Signal Word	Danger
Hazard Statements	
H228	Flammable solid.
H251	Self-heating; may catch fire.
Precautionary Statements	
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P235	Keep cool.
P240	Ground and bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
Supplemental Hazard Statements	none

Reduced Labeling (<= 125 ml)

Pictogram	
Signal Word	Danger
Hazard Statements	
H251	Self-heating; may catch fire.
Precautionary Statements	
P235	Keep cool.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

Ecological information:
The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.
Toxicological information:
The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

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SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	Fe
Molecular weight	:	55,85 g/mol
CAS-No.	:	7439-89-6
EC-No.	:	231-096-4

No components need to be disclosed according to the applicable regulations.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

In case of eye contact
After eye contact: rinse out with plenty of water. Remove contact lenses.

If swallowed
After swallowing: make victim drink water (two glasses at most). Consult doctor if feeling unwell.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Water Foam Carbon dioxide (CO2) Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

Iron oxides
Combustible.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters

In the event of fire, wear self-contained breathing apparatus.

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5.4 Further information
Suppress (knock down) gases/vapors/mists with a water spray jet.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Avoid inhalation of dusts. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains. Risk of explosion.

6.3 Methods and materials for containment and cleaning up
Observe possible material restrictions (see sections 7 and 10). Take up dry. Dispose of properly. Clean up affected area. Avoid generation of dusts.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on protection against fire and explosion
Keep away from open flames, hot surfaces and sources of ignition.Take precautionary measures against static discharge.

Hygiene measures
Change contaminated clothing. Wash hands after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Keep away from heat and sources of ignition.

Storage class
Storage class (TRGS 510): 4.2: Pyrophoric and self-heating hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

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SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

8.2 Exposure controls

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Body Protection
Flame retardant antistatic protective clothing.

Respiratory protection
required when dusts are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.
Recommended Filter type: Filter type P1

The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.

Control of environmental exposure
Do not let product enter drains. Risk of explosion.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Physical state	powder
b)	Color	light gray
c)	Odor	odorless
d)	Melting point/freezing point	Melting point/range: 1.538 °C at 1.023 hPa
e)	Initial boiling point and boiling range	2.861 °C at 1.013 hPa
f)	Flammability (solid, gas)	The substance or mixture is a flammable solid with the category 1.
g)	Upper/lower flammability or explosive limits	No data available
h)	Flash point	Not applicable
i)	Autoignition temperature	The substance or mixture is classified as self heating with the category 1.

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j)	Decomposition temperature	No data available
k)	pH	Not applicable
l)	Viscosity	Viscosity, kinematic: No data available Viscosity, dynamic: No data available
m)	Water solubility	insoluble
n)	Partition coefficient: n-octanol/water	Not applicable for inorganic substances
o)	Vapor pressure	Not applicable
p)	Density	7,87 g/cm3 at 20 °C
	Relative density	7,87 at 20 °C
q)	Relative vapor density	
r)	Particle characteristics	No data available
s)	Explosive properties	Not classified as explosive.
t)	Oxidizing properties	The substance or mixture is not classified as oxidizing.

9.2 Other safety information

Dust explosion class St1

SECTION 10: Stability and reactivity

10.1 Reactivity

Self-heating; may catch fire.
The following applies in general to flammable organic substances and mixtures: in correspondingly fine distribution, when whirled up a dust explosion potential may generally be assumed.

10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

no information available

10.5 Incompatible materials

Strong acids

10.6 Hazardous decomposition products

In the event of fire: see section 5

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SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 7.500 mg/kg
Remarks: (Lit.)
Inhalation: No data available
Dermal: No data available

Skin corrosion/irritation
Remarks: No skin irritation

Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation
(OECD Test Guideline 405)
Remarks: (Lit.)

Respiratory or skin sensitization
Did not cause sensitization on laboratory animals.

Germ cell mutagenicity
Test system: S. typhimurium
Method: OECD Test Guideline 471
Result: Not mutagenic in Ames Test.
Remarks: (Lit.)

Carcinogenicity
No data available

Reproductive toxicity
Did not show teratogenic effects in animal experiments.
Animal testing did not show any effects on fertility.

Specific target organ toxicity - single exposure
The substance or mixture is not classified as specific target organ toxicant, single exposure.

Specific target organ toxicity - repeated exposure
The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Aspiration hazard
No data available

11.2 Additional Information

Endocrine disrupting properties

Product:

Assessment	The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

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SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	static test	- Morone saxatilis - 13,6 mg/l - 96 h

12.2 Persistence and degradability
Not applicable

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Endocrine disrupting properties
Product:

Assessment : The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

12.7 Other adverse effects
No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods
No data available

SECTION 14: Transport information

14.1 UN number
ADR/RID: 3178 IMDG: 3178 IATA: 3178

14.2 UN proper shipping name
ADR/RID: FLAMMABLE SOLID, INORGANIC, N.O.S. (Iron Powder,)
IMDG: FLAMMABLE SOLID, INORGANIC, N.O.S. (Iron Powder,)
IATA: Flammable solid, inorganic, n.o.s. (Iron Powder,)

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14.3 Transport hazard class(es)

ADR/RID: 4.1	IMDG: 4.1	IATA: 4.1

14.4 Packaging group

ADR/RID: III	IMDG: III	IATA: III

14.5 Environmental hazards

ADR/RID: no	IMDG Marine pollutant: no	IATA: no

14.6 Special precautions for user

Tunnel restriction code : (E)

Further information : No data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

This material safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006.

Other regulations

Take note of Dir 94/33/EC on the protection of young people at work.

15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out

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SECTION 16: Other information

Full text of other abbreviations

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - Agreement concerning the International Carriage of Dangerous Goods by Road; AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RID - Regulations concerning the International Carriage of Dangerous Goods by Rail; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TECI - Thailand Existing Chemicals Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

Further information

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SAFETY DATA SHEET

Version 5.8
Revision Date 03/06/2015
Print Date 02/18/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Isopropyl alcohol

Product Number : W292907
Brand : Aldrich
Index-No. : 603-117-00-0

CAS-No. : 67-63-0

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 2), H225
Eye irritation (Category 2A), H319
Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H225 Highly flammable liquid and vapour.
H319 Causes serious eye irritation.
H336 May cause drowsiness or dizziness.

Precautionary statement(s)
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P233 Keep container tightly closed.
P240 Ground/bond container and receiving equipment.
P241 Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242 Use only non-sparking tools.
P243 Take precautionary measures against static discharge.
P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.

P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P312	Call a POISON CENTER or doctor/ physician if you feel unwell.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

May form explosive peroxides.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	2-Propanol sec-Propyl alcohol Isopropyl alcohol Isopropanol
Formula	:	C_3H_8O
Molecular weight	:	60.10 g/mol
CAS-No.	:	67-63-0
EC-No.	:	200-661-7
Index-No.	:	603-117-00-0

Hazardous components

Component	Classification	Concentration
2-Propanol		
	Flam. Liq. 2; Eye Irrit. 2A; STOT SE 3; H225, H319, H336	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Move out of dangerous area.Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Use explosion-proof equipment.Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Handle and store under inert gas. hygroscopic

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
2-Propanol	67-63-0	TWA	200.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Central Nervous System impairment		

		Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		TWA	200 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		STEL	400 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		STEL	400.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		TWA	400.000000 ppm 980.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		
		TWA	400.000000 ppm 980.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	500.000000 ppm 1,225.000000 mg/m3	USA. NIOSH Recommended Exposure Limits

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
2-Propanol	67-63-0	Acetone	40.0000 mg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift at end of workweek			

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 480 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.2 mm
Break through time: 60 min
Material tested:Dermatril® P (KCL 743 / Aldrich Z677388, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
impervious clothing, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Colour: colourless
b)	Odour	alcohol-like
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -89.5 °C (-129.1 °F) - lit.
f)	Initial boiling point and boiling range	82 °C (180 °F) - lit.
g)	Flash point	12.0 °C (53.6 °F) - closed cup
h)	Evaporation rate	3.0
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or	Upper explosion limit: 12.7 %(V) Lower explosion limit: 2 %(V)

	explosive limits	
k)	Vapour pressure	43.2 hPa (32.4 mmHg) at 20.0 °C (68.0 °F) 58.7 hPa (44.0 mmHg) at 25.0 °C (77.0 °F)
l)	Vapour density	No data available
m)	Relative density	0.785 g/cm3 at 25 °C (77 °F)
n)	Water solubility	completely soluble
o)	Partition coefficient: n-octanol/water	log Pow: 0.05
p)	Auto-ignition temperature	425.0 °C (797.0 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Surface tension	20.8 mN/m at 25.0 °C (77.0 °F)

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Test for peroxide formation before distillation or evaporation. Test for peroxide formation or discard after 1 year.
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Vapours may form explosive mixture with air.

10.4 Conditions to avoid
Heat, flames and sparks. Extremes of temperature and direct sunlight.

10.5 Incompatible materials
Oxidizing agents, Acid anhydrides, Aluminium, Halogenated compounds, Acids

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 5,045 mg/kg
Remarks: Behavioral:Altered sleep time (including change in righting reflex). Behavioral:Somnolence (general depressed activity).

LC50 Inhalation - Rat - 8 h - 16000 ppm

LD50 Dermal - Rabbit - 12,800 mg/kg

No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Mild skin irritation

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Eye irritation - 24 h

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC:	3 - Group 3: Not classifiable as to its carcinogenicity to humans (2-Propanol)
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
Inhalation, Oral - May cause drowsiness or dizziness.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: NT8050000

Central nervous system depression, prolonged or repeated exposure can cause:, Nausea, Headache, Vomiting, narcosis, Drowsiness, Overexposure may cause mild, reversible liver effects., Aspiration may lead to:, Lung oedema, Pneumonia
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Kidney - Irregularities - Based on Human Evidence
Kidney - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - 9,640.00 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 5,102.00 mg/l - 24 h
	Immobilization EC50 - Daphnia magna (Water flea) - 6,851 mg/l - 24 h
Toxicity to algae	EC50 - Desmodesmus subspicatus (green algae) - > 2,000.00 mg/l - 72 h
	EC50 - Algae - > 1,000.00 mg/l - 24 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No bioaccumulation is to be expected (log Pow <= 4).

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1219 Class: 3 Packing group: II
Proper shipping name: Isopropanol
Reportable Quantity (RQ):

Poison Inhalation Hazard: No

IMDG
UN number: 1219 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: ISOPROPANOL

IATA
UN number: 1219 Class: 3 Packing group: II
Proper shipping name: Isopropanol

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
2-Propanol	67-63-0	1987-01-01

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
2-Propanol	67-63-0	1987-01-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
2-Propanol	67-63-0	1987-01-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
2-Propanol	67-63-0	1987-01-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Eye Irrit.	Eye irritation
Flam. Liq.	Flammable liquids
H225	Highly flammable liquid and vapour.
H319	Causes serious eye irritation.
H336	May cause drowsiness or dizziness.
STOT SE	Specific target organ toxicity - single exposure

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	3
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	3
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.8 Revision Date: 03/06/2015 Print Date: 02/18/2016

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Version 6.12
Revision Date 04.03.2024
Print Date 16.09.2024
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Lead
Product Number	:	391352
Brand	:	Aldrich
Index-No.	:	082-013-00-1
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	7439-92-1

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Inc. 3050 SPRUCE ST ST. LOUIS MO 63103 UNITED STATES
Telephone	:	+1 314 771-5765
Fax	:	+1 800 325-5052

1.4 Emergency telephone

Emergency Phone #	:	800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Reproductive toxicity, (Category 1A)	H360FD: May damage fertility. May damage the unborn child.
Effects on or via lactation	H362: May cause harm to breast-fed

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children.

Specific target organ toxicity - repeated exposure, (Category 1), Central nervous system, Blood, Immune system, Kidney	H372: Causes damage to organs through prolonged or repeated exposure if swallowed.
Short-term (acute) aquatic hazard, (Category 1)	H400: Very toxic to aquatic life.
Long-term (chronic) aquatic hazard, (Category 1)	H410: Very toxic to aquatic life with long lasting effects.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008

Pictogram

Signal Word	Danger
Hazard Statements	
H360FD	May damage fertility. May damage the unborn child.
H362	May cause harm to breast-fed children.
H372	Causes damage to organs (Central nervous system, Blood, Immune system, Kidney) through prolonged or repeated exposure if swallowed.
H410	Very toxic to aquatic life with long lasting effects.
Precautionary Statements	
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust.
P263	Avoid contact during pregnancy and while nursing.
P264	Wash skin thoroughly after handling.
P273	Avoid release to the environment.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
Supplemental Hazard Statements	none
	Restricted to professional users.

Reduced Labeling (<= 125 ml)

Pictogram

Signal Word	Danger
Hazard Statements	
H362	May cause harm to breast-fed children.
H372	Causes damage to organs through prolonged or repeated exposure if swallowed.
H360FD	May damage fertility. May damage the unborn child.

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Precautionary Statements

P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust.
P264	Wash skin thoroughly after handling.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

Ecological information:
The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.
Toxicological information:
The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	Pb
Molecular weight	:	207,20 g/mol
CAS-No.	:	7439-92-1
EC-No.	:	231-100-4
Index-No.	:	082-013-00-1

Component	Classification	Concentration
Lead Included in the Candidate List of Substances of Very High Concern (SVHC) according to Regulation (EC) No. 1907/2006 (REACH)		
CAS-No. 7439-92-1 EC-No. 231-100-4 Index-No. 082-013-00-1	Repr. 1A; Lact. ; STOT RE 1; Aquatic Acute 1; Aquatic Chronic 1; H360FD, H362, H372, H400, H410 Concentration limits: >= 2,5 %: Repr. 2, H361f; >= 0,5 %: STOT RE 2, H373; >= 0,03 %: Repr. 1A, H360D; M-Factor - Aquatic Acute: 1 - Aquatic Chronic: 10	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

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SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Call in physician.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

In case of eye contact
After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

If swallowed
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Water Foam Carbon dioxide (CO2) Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Nature of decomposition products not known.
Combustible.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information
Suppress (knock down) gases/vapors/mists with a water spray jet.

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SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Avoid generation and inhalation of dusts in all circumstances. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions

No special precautionary measures necessary.

6.3 Methods and materials for containment and cleaning up

Observe possible material restrictions (see sections 7 and 10). Take up carefully. Dispose of properly. Clean up affected area. Avoid generation of dusts.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Work under hood. Do not inhale substance/mixture.

Hygiene measures
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Dry. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.

Storage class
Storage class (TRGS 510): 6.1C: Combustible, acute toxic Cat.3 / toxic compounds or compounds which causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

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SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

8.2 Exposure controls

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of Regulation (EU) 2016/425 and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the EC approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
protective clothing

Respiratory protection
required when dusts are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.
Recommended Filter type: Filter type P3

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The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.

Control of environmental exposure
No special precautionary measures necessary.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Physical state	powder
b)	Color	No data available
c)	Odor	No data available
d)	Melting point/freezing point	Melting point/range: 327,4 °C - lit.
e)	Initial boiling point and boiling range	1.740 °C - lit.
f)	Flammability (solid, gas)	No data available
g)	Upper/lower flammability or explosive limits	No data available
h)	Flash point	Not applicable
i)	Autoignition temperature	No data available
j)	Decomposition temperature	No data available
k)	pH	No data available
l)	Viscosity	Viscosity, kinematic: No data available Viscosity, dynamic: No data available
m)	Water solubility	0,185 g/l at 20 °C at 1.013 hPa - OECD Test Guideline 105- partly soluble
n)	Partition coefficient: n-octanol/water	Not applicable for inorganic substances
o)	Vapor pressure	No data available
p)	Density	11,45 g/cm3 at 23,8 °C at 1.013 hPa - OECD Test Guideline 109
	Relative density	11,45 at 23,8 °C - OECD Test Guideline 109
q)	Relative vapor density	
r)	Particle characteristics	No data available

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s) Explosive properties No data available

t) Oxidizing properties none

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
The following applies in general to flammable organic substances and mixtures: in correspondingly fine distribution, when whirled up a dust explosion potential may generally be assumed.

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
Risk of explosion with:
azides
picrates
ammonium nitrate
Strong oxidizing agents
Exothermic reaction with:
Fluorine
hydrogen peroxide
Generates dangerous gases or fumes in contact with:
Nitric acid

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - male and female - > 2.000 mg/kg
(OECD Test Guideline 423)
LC50 Inhalation - Rat - male and female - 4 h - > 5,05 mg/l - dust/mist

(OECD Test Guideline 403)
LD50 Dermal - Rat - male and female - > 2.000 mg/kg
(OECD Test Guideline 402)

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation - 4 h

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(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation - 72 h
(OECD Test Guideline 405)

Respiratory or skin sensitization
Maximization Test - Guinea pig
Result: negative
(OECD Test Guideline 406)

Germ cell mutagenicity

Test Type: Micronucleus test
Species: Rat
Cell type: Red blood cells (erythrocytes)
Application Route: Oral

Result: positive
Remarks: (ECHA)

Test Type: comet assay
Species: Mouse
Cell type: Liver cells
Application Route: Inhalation

Result: negative
Remarks: (ECHA)

Test Type: Micronucleus test
Species: Mouse
Cell type: Bone marrow
Application Route: Oral

Result: Positive results were obtained in some in vivo tests.
Remarks: (ECHA)

Test Type: Chromosome aberration test in vitro
Species: Monkey
Cell type: lymphocyte
Application Route: Oral

Result: Positive results were obtained in some in vivo tests.
Remarks: (ECHA)

Carcinogenicity
No data available

Reproductive toxicity
May damage the unborn child. Positive evidence from human epidemiological studies.
May damage fertility. Positive evidence from human epidemiological studies. Studies indicating a hazard to babies during the lactation period

Specific target organ toxicity - single exposure

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No data available

Specific target organ toxicity - repeated exposure
Oral - Causes damage to organs through prolonged or repeated exposure.
- Central nervous system, Blood, Immune system, Kidney

Aspiration hazard
No data available

11.2 Additional Information

Endocrine disrupting properties

Product:

Assessment	The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

RTECS: OF7525000
anemia
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

On the basis of the morphology of the product, no hazardous properties are to be expected when it is handled and used with appropriate care.

The following applies to lead compounds in general: Due to the poor absorbability via the gastrointestinal tract, only very high doses lead to acute cases of intoxication. After a latency period of several hours, metallic taste, nausea, vomiting, and colics occur, in many instances followed by shock. Chronic uptake causes peripheral muscular weakness ("drop-wrist"), anaemia, and central-nervous disorders. Women of child-bearing age should not be exposed to the substance over longer periods of time (observe critical threshold).

Handle in accordance with good industrial hygiene and safety practice.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	static test LC50 - Oncorhynchus mykiss (rainbow trout) - 0,1 mg/l - 96 h Remarks: (ECHA)
Toxicity to algae	mortality EC50 - Skeletonema costatum - 7,94 mg/l - 10 d Remarks: (ECOTOX Database) (Lead)
Toxicity to fish(Chronic toxicity)	flow-through test NOEC - Cyprinodon variegatus (sheepshead minnow) - 0,23 mg/l - 28 d

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Remarks: (ECHA)

12.2 Persistence and degradability

Biodegradability — Result: - According to the results of tests of biodegradability this product is not readily biodegradable.
Remarks: The methods for determining biodegradability are not applicable to inorganic substances.

12.3 Bioaccumulative potential

Bioaccumulation — Oncorhynchus kisutch - 2 Weeks
- 150 µg/l(Lead)

Bioconcentration factor (BCF): 12

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Endocrine disrupting properties

Product:

Assessment : The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

12.7 Other adverse effects

Discharge into the environment must be avoided.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 3077 IMDG: 3077 IATA: 3077

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14.2 UN proper shipping name

ADR/RID: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Lead)
IMDG: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Lead)
IATA: Environmentally hazardous substance, solid, n.o.s. (Lead)

14.3 Transport hazard class(es)

ADR/RID: 9 IMDG: 9 IATA: 9

14.4 Packaging group

ADR/RID: III IMDG: III IATA: III

14.5 Environmental hazards

ADR/RID: yes IMDG Marine pollutant: yes IATA: yes

14.6 Special precautions for user

Tunnel restriction code : (-)

Further information

EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

This material safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006.

Authorisations and/or restrictions on use

REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59).	: Lead
REACH - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles (Annex XVII)	: Lead

National legislation

Seveso III: Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances.	E1	ENVIRONMENTAL HAZARDS

Other regulations

Observe work restrictions regarding maternity protection in accordance to Dir 92/85/EEC or stricter national regulations where applicable.

Take note of Dir 94/33/EC on the protection of young people at work.

15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out

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SECTION 16: Other information

Full text of H-Statements

H360D	May damage the unborn child.
H360FD	May damage fertility. May damage the unborn child.
H361f	Suspected of damaging fertility.
H362	May cause harm to breast-fed children.
H372	Causes damage to organs through prolonged or repeated exposure if swallowed.

Full text of other abbreviations

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - Agreement concerning the International Carriage of Dangerous Goods by Road; AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RID - Regulations concerning the International Carriage of Dangerous Goods by Rail; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TECI - Thailand Existing Chemicals Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact

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SAFETY DATA SHEET

Version 6.6
Revision Date 09/06/2024
Print Date 09/07/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Magnesium

Product Number : 266302
Brand : Sigma-Aldrich
Index-No. : 012-002-00-9
CAS-No. : 7439-95-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable solids (Category 1), H228
Self-heating chemicals (Category 1), H251
Chemicals which, in contact with water, emit flammable gases (Category 2), H261

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For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal Word	Danger

Hazard Statements

H228	Flammable solid.
H251	Self-heating; may catch fire.
H261	In contact with water releases flammable gas.

Precautionary Statements

P210	Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P223	Do not allow contact with water.
P231 + P232	Handle under inert gas. Protect from moisture.
P235 + P410	Keep cool. Protect from sunlight.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P280	Wear protective gloves/ eye protection/ face protection.
P335 + P334	Brush off loose particles from skin. Immerse in cool water/ wrap in wet bandages.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P402 + P404	Store in a dry place. Store in a closed container.
P403 + P235	Store in a well-ventilated place. Keep cool.
P407	Maintain air gap between stacks/ pallets.
P420	Store away from other materials.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Combustible dust

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	Mg
Molecular weight	:	24.31 g/mol
CAS-No.	:	7439-95-4
EC-No.	:	231-104-6
Index-No.	:	012-002-00-9

No components need to be disclosed according to the applicable regulations.

For the full text of the H-Statements mentioned in this Section, see Section 16.

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SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

In case of eye contact
After eye contact: rinse out with plenty of water. Remove contact lenses.

If swallowed
After swallowing: make victim drink water (two glasses at most). Consult doctor if feeling unwell.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Special powder against metal fire Cover with dry sand or cement.

Unsuitable extinguishing media
Foam Water

5.2 Special hazards arising from the substance or mixture

Magnesium oxide
Not combustible.
May not get in touch with: Water
Ambient fire may liberate hazardous vapours.

5.3 Advice for firefighters

In the event of fire, wear self-contained breathing apparatus.

5.4 Further information

none

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SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Avoid inhalation of dusts. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains. Risk of explosion.

6.3 Methods and materials for containment and cleaning up

Observe possible material restrictions (see sections 7 and 10). Take up dry. Dispose of properly. Clean up affected area. Avoid generation of dusts.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Keep workplace dry. Do not allow product to come into contact with water.

Advice on protection against fire and explosion
Keep away from open flames, hot surfaces and sources of ignition.Take precautionary measures against static discharge.

Hygiene measures
Change contaminated clothing. Wash hands after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Keep away from heat and sources of ignition.
Never allow product to get in contact with water during storage.

Storage class
Storage class (TRGS 510): 4.2: Pyrophoric and self-heating hazardous materials

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters
Contains no substances with occupational exposure limit values.

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8.2 Exposure controls

Appropriate engineering controls

Change contaminated clothing. Wash hands after working with substance.

Personal protective equipment

Eye/face protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the EC approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Flame retardant antistatic protective clothing.

Respiratory protection

Recommended Filter type: Filter type P1
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when dusts are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure

Do not let product enter drains. Risk of explosion.

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SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: chips
b)	Odor	No data available
c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/ range: 648 °C (1198 °F) - lit.
f)	Initial boiling point and boiling range	1,090 °C 1,994 °F - lit.
g)	Flash point	()No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	May form combustible dust concentrations in air.
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	1 hPa at 621 °C (1150 °F)
l)	Vapor density	No data available
m)	Density	1.74 g/mL at 25 °C (77 °F) - lit.
	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Autoignition temperature	The substance or mixture is classified as self heating with the category 1.
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	none

9.2 Other safety information

No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

Self-heating; may catch fire.

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10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
Risk of ignition or formation of inflammable gases or vapours with:
Oxidizing agents
alkalines
Halogenated hydrocarbon
halogens
Alcohols
nitrates
acids
Water

10.4 Conditions to avoid
Exposure to moisture. Exposure to air.
Moisture.

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
Oral: No data available
Inhalation: No data available
Dermal: No data available

Skin corrosion/irritation
Remarks: No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

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Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, chills, Fever, fatigue, muscle pain, joint pain, rash, Anorexia.
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Liver - Irregularities - Based on Human Evidence

Liver - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties
No data available

12.7 Other adverse effects
No data available

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SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)
UN number: 1869 Class: 4.1 Packing group: III
Proper shipping name: Magnesium
Reportable Quantity (RQ):
Poison Inhalation Hazard: No

IMDG
UN number: 1869 Class: 4.1 Packing group: III EMS-No: F-G, S-G
Proper shipping name: MAGNESIUM

IATA
UN number: 1869 Class: 4.1 Packing group: III
Proper shipping name: Magnesium

SECTION 15: Regulatory information

CERCLA Reportable Quantity

This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards	:	Fire Hazard Reactivity Hazard Chronic Health Hazard
SARA 313	:	This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

US State Regulations

Massachusetts Right To Know

No components are subject to the Massachusetts Right to Know Act.

Maine Chemicals of High Concern

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Product does not contain any listed chemicals

Vermont Chemicals of High Concern

Product does not contain any listed chemicals

Washington Chemicals of High Concern

Product does not contain any listed chemicals

The ingredients of this product are reported in the following inventories:

TSCA : All substances listed as active on the TSCA inventory

TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.6 Revision Date: 09/06/2024 Print Date: 09/07/2024

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SAFETY DATA SHEET

Version 4.6
Revision Date 03/02/2015
Print Date 02/07/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Manganese

Product Number : 463728
Brand : Aldrich

CAS-No. : 7439-96-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Substances and mixtures, which in contact with water, emit flammable gases (Category 1), H260
Acute aquatic toxicity (Category 3), H402
Chronic aquatic toxicity (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H260 In contact with water releases flammable gases which may ignite spontaneously.
H412 Harmful to aquatic life with long lasting effects.

Precautionary statement(s)
P223 Keep away from any possible contact with water, because of violent reaction and possible flash fire.
P231 + P232 Handle under inert gas. Protect from moisture.
P273 Avoid release to the environment.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P335 + P334 Brush off loose particles from skin. Immerse in cool water/ wrap in wet bandages.

P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P402 + P404	Store in a dry place. Store in a closed container.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	Mn
Molecular weight	:	54.94 g/mol
CAS-No.	:	7439-96-5
EC-No.	:	231-105-1

Hazardous components

Component	Classification	Concentration
Manganese		
	Water-react. 1; Aquatic Acute 3; Aquatic Chronic 3; H260, H412	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Dry powder Carbon dioxide (CO2)

Unsuitable extinguishing media
Water

5.2 Special hazards arising from the substance or mixture
Manganese/manganese oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Do not flush with water. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.Keep away from sources of ignition - No smoking.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.
Never allow product to get in contact with water during storage.

Moisture sensitive. Keep in a dry place.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Manganese	7439-96-5	TWA	0.200000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Central Nervous System impairment Adopted values or notations enclosed are those for which changes are proposed in the NIC See Notice of Intended Changes (NIC)		
		C	5 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Ceiling limit is to be determined from breathing-zone air samples.		
		C	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Ceiling limit is to be determined from breathing-zone air samples.		

		TWA	1.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	3.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	1.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	3.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		C	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Ceiling limit is to be determined from breathing-zone air samples.		
		TWA	1.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	3.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	0.200000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Adopted values or notations enclosed are those for which changes are proposed in the NIC See Notice of Intended Changes (NIC) varies		
		TWA	0.100000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment 2014 Adoption varies		
		TWA	0.020000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment 2014 Adoption varies		
		TWA	0.1 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment varies		
		TWA	0.02 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment varies		

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection
impervious clothing, Flame retardant protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder Colour: grey
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 1,244 °C (2,271 °F) - lit.
f)	Initial boiling point and boiling range	1,962 °C (3,564 °F) - lit.
g)	Flash point	Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	7.3 g/mL at 25 °C (77 °F)
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Reacts violently with water.

10.4 Conditions to avoid
Exposure to moisture

10.5 Incompatible materials
acids, Halogens, Bases, Phosphorus, Sulphur oxides, Peroxides

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 9,000 mg/kg

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Mild skin irritation - 24 h

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Mild eye irritation - 24 h

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

Carcinogenicity - Rat - Intramuscular
Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Tumorigenic:Tumors at site or application.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

May cause reproductive disorders.

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: OO9275000

Men exposed to manganese dusts showed a decrease in fertility. Chronic manganese poisoning primarily involves the central nervous system. Early symptoms include languor, sleepiness and weakness in the legs. A stolid mask-like appearance of the face, emotional disturbances such as uncontrollable laughter and a spastic gait with tendency to fall in walking are findings in more advanced cases. High incidence of pneumonia has been found in workers exposed to the dust or fume of some manganese compounds.

Stomach - Irregularities - Based on Human Evidence
Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 40 mg/l - 48 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Harmful to aquatic life.

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3208 Class: 4.3 Packing group: I
Proper shipping name: Metallic substance, water-reactive, n.o.s. (Manganese)

Poison Inhalation Hazard: No

IMDG
UN number: 3208 Class: 4.3 Packing group: I EMS-No: F-G, S-N
Proper shipping name: METALLIC SUBSTANCE, WATER-REACTIVE, N.O.S. (Manganese)

IATA
UN number: 3208 Class: 4.3 Packing group: I
Proper shipping name: Metallic substance, water-reactive, n.o.s. (Manganese)
IATA Passenger: Not permitted for transport

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

	CAS-No.	Revision Date
Manganese	7439-96-5	2007-07-01

SARA 311/312 Hazards
Reactivity Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Manganese	7439-96-5	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Manganese	7439-96-5	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Manganese	7439-96-5	2007-07-01

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
H260	In contact with water releases flammable gases which may ignite spontaneously.
H402	Harmful to aquatic life.
H412	Harmful to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	0
Chronic Health Hazard:	*
Flammability:	3
Physical Hazard	2

NFPA Rating

Health hazard:	0
Fire Hazard:	0
Reactivity Hazard:	2
Special hazard.I:	W

Further information
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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information
Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.6 Revision Date: 03/02/2015 Print Date: 02/07/2016

SAFETY DATA SHEET

Version 6.5
Revision Date 02/07/2023
Print Date 02/07/2023

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Mercury

Product Number : 215457
Brand : SIGALD
Index-No. : 080-001-00-0
CAS-No. : 7439-97-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Scientific research and development, Reagent for analysis

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Inhalation (Category 2), H330
Reproductive toxicity (Category 1B), H360
Specific target organ toxicity - repeated exposure (Category 1), H372
Short-term (acute) aquatic hazard (Category 1), H400
Long-term (chronic) aquatic hazard (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal Word Danger

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Hazard statement(s)

H330	Fatal if inhaled.
H360	May damage fertility or the unborn child.
H372	Causes damage to organs through prolonged or repeated exposure.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust/ fume/ gas/ mist/ vapors/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P284	Wear respiratory protection.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	Hg
Molecular weight	:	200.59 g/mol
CAS-No.	:	7439-97-6
EC-No.	:	231-106-7
Index-No.	:	080-001-00-0

Component	Classification	Concentration
mercury		
	Acute Tox. 2; Repr. 1B; STOT RE 1; Aquatic Acute 1; Aquatic Chronic 1; H330, H360, H372, H400, H410 M-Factor - Aquatic Acute: 1 - Aquatic Chronic: 100	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

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SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
First aiders need to protect themselves. Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Immediately call in physician. If breathing stops: immediately apply artificial respiration, if necessary also oxygen.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

In case of eye contact
After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

If swallowed
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Mercury/mercury oxides.
Not combustible.
Ambient fire may liberate hazardous vapours.

5.3 Advice for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information
Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

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SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal. In some instances, a mercury spill kit may be used. Please consult with your site EHS representative to determine the most appropriate clean up method.Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

Hygiene measures
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.

Store under inert gas.

Storage class
Storage class (TRGS 510): 6.1B: Non-combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

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Component	CAS-No.	Value	Control parameters	Basis
mercury	7439-97-6	C	0.1 mg/m3	USA. NIOSH Recommended Exposure Limits
	Remarks	Potential for dermal absorption		
		CEIL	1.0mg/10m3	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		TWA	0.05 mg/m3	USA. Table Z-1-A Limits for Air Contaminants (1989 vacated values)
		Skin notation		
		TWA	0.025 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Kidney damage Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen Danger of cutaneous absorption		
		TWA	0.05 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential for dermal absorption		

8.2 Exposure controls

Appropriate engineering controls
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

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Body Protection
protective clothing

Respiratory protection
required when vapours/aerosols are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Color: silver, white
b)	Odor	odorless
c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -38.87 °C (-37.97 °F) - lit.
f)	Initial boiling point and boiling range	356.6 °C 673.9 °F - lit.
g)	Flash point	()Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	The product is not flammable.
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	< 0.01 hPa at 20 °C (68 °F) 1 hPa at 126 °C(259 °F)
l)	Vapor density	6.93 - (Air = 1.0)
m)	Density	13.55 g/cm3 at 25 °C (77 °F)
	Relative density	No data available
n)	Water solubility	0.00006 g/l at 25 °C (77 °F)
o)	Partition coefficient: n-octanol/water	Not applicable for inorganic substances
p)	Autoignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available

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s) Explosive properties No data available

t) Oxidizing properties none

9.2 Other safety information

Relative vapor density	6.93 - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
Risk of explosion with:
Acetylene
Alkali metals
Aluminum
Amines
Ammonia
chlorine dioxide
Potassium
sodium
oxalic acid
perchlorates
Risk of ignition or formation of inflammable gases or vapours with:
Chlorine
silanes
Oxygen
Generates dangerous gases or fumes in contact with:
Nitric acid
Exothermic reaction with:
Bromine
Metals
acetylidene
Oxygen

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
Aluminum, Lead, Copper, silver, Zinc, zinc alloys, Tin

10.6 Hazardous decomposition products
In the event of fire: see section 5

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SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
Oral: No data available
LC50 Inhalation - Rat - male - 2 h - < 27 mg/m3 - vapor

Dermal: No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity
This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
Presumed human reproductive toxicant

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard
No data available

11.2 Additional Information

RTECS: OV4550000
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

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SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	mortality LC50 - Cyprinus carpio (Carp) - 0.160 mg/l - 96 h
Toxicity to fish(Chronic toxicity)	Remarks: No data available (mercury)

12.2 Persistence and degradability

The methods for determining biodegradability are not applicable to inorganic substances.

12.3 Bioaccumulative potential

Bioaccumulation	Carassius auratus (goldfish) - 1,789 d - 0.25 µg/l(mercury)
	Bioconcentration factor (BCF): 155,986

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties

No data available

12.7 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself. See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14: Transport information

DOT (US)

UN number: 2809 Class: 8 (6.1) Packing group: III
Proper shipping name: Mercury
Reportable Quantity (RQ): 1 lbs
Reportable Quantity (RQ): 1 lbs
Poison Inhalation Hazard: No

IMDG

UN number: 2809 Class: 8 (6.1) Packing group: III EMS-No: F-A, S-B
Proper shipping name: MERCURY
Marine pollutant : yes

IATA

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UN number: 2809 Class: 8 (6.1) Packing group: III
Proper shipping name: Mercury

SECTION 15: Regulatory information

SARA 302 Components
This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
mercury	7439-97-6	2015-11-23

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Reportable Quantity : D009 lbs

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
mercury	7439-97-6	2015-11-23

California Prop. 65 Components

, which is/are known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.mercury	CAS-No. 7439-97-6	Revision Date 2013-12-20

SECTION 16: Other information

Further information
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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SAFETY DATA SHEET

Version 3.8
Revision Date 05/27/2016
Print Date 11/13/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name	:	Methane
Product Number	:	295477
Brand	:	Aldrich
Index-No.	:	601-001-00-4
CAS-No.	:	74-82-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+1 800-325-5832
Fax	:	+1 800-325-5052

1.4 Emergency telephone number

Emergency Phone #	:	+1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable gases (Category 1), H220
Gases under pressure (Compressed gas), H280
Simple Asphyxiant,

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word: Danger

Hazard statement(s)

H220	Extremely flammable gas.
H280	Contains gas under pressure; may explode if heated. May displace oxygen and cause rapid suffocation.

Precautionary statement(s)

P210	Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P377	Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381	Eliminate all ignition sources if safe to do so.
P410 + P403	Protect from sunlight. Store in a well-ventilated place.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	CH_4
Molecular weight	:	16.04 g/mol
CAS-No.	:	74-82-8
EC-No.	:	200-812-7
Index-No.	:	601-001-00-4

Hazardous components

Component	Classification	Concentration
Methane		
	Flam. Gas 1; Press. Gas Compr. Gas; SA ; H220, H280,	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

No data available

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Clean up promptly by sweeping or vacuum.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid inhalation of vapour or mist.
Use explosion-proof equipment.Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

Contents under pressure.
Storage class (TRGS 510): Gases

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Methane	74-82-8	TWA	1,000.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Central Nervous System impairment Cardiac sensitization		
		See Appendix F: Minimal Oxygen Content Asphyxia 2015 Adoption		
		TWA	0.100000 mg/m3	USA. NIOSH Recommended Exposure Limits
		'Ca' in the presence of formaldehyde, acetaldehyde, or malonaldehyde. See Appendices A & C (Aldehydes).		
		TWA	0.100000 mg/m3	USA. NIOSH Recommended Exposure Limits
		'Ca' in the presence of formaldehyde, acetaldehyde, or malonaldehyde. See Appendices A & C (Aldehydes).		
		See Appendix F: Minimal Oxygen Content Asphyxia		
		TWA	0.1 mg/m3	USA. NIOSH Recommended Exposure Limits
		'Ca' in the presence of formaldehyde, acetaldehyde, or malonaldehyde. See Appendices A & C (Aldehydes).		

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 60 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Impervious clothing, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: gaseous Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -183 °C (-297 °F) - lit.
f)	Initial boiling point and boiling range	-161 °C (-258 °F) - lit.
g)	Flash point	-188 °C (-306 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower	Upper explosion limit: 15 %(V)

	flammability or explosive limits	Lower explosion limit: 5 %(V)
k)	Vapour pressure	No data available
l)	Vapour density	0.55 - (Air = 1.0)
m)	Relative density	0.716 g/cm3 at 25 °C (77 °F)
n)	Water solubility	3.5 g/l at 17 °C (63 °F)
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Relative vapour density	0.55 - (Air = 1.0)

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: PA1490000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1971 Class: 2.1

Proper shipping name: Methane, compressed
Reportable Quantity (RQ):

Poison Inhalation Hazard: No

IMDG
UN number: 1971 Class: 2.1 EMS-No: F-D, S-U
Proper shipping name: METHANE, COMPRESSED

IATA
UN number: 1971 Class: 2.1
Proper shipping name: Methane, compressed
IATA Passenger: Not permitted for transport

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Fire Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Methane	74-82-8	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Methane	74-82-8	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Methane	74-82-8	1993-04-24

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

	May displace oxygen and cause rapid suffocation.
Flam. Gas	Flammable gases
H220	Extremely flammable gas.
H280	Contains gas under pressure; may explode if heated.
Press. Gas	Gases under pressure
SA	Simple Asphyxiant

HMIS Rating

Health hazard:	0
Chronic Health Hazard:	
Flammability:	4
Physical Hazard	3

NFPA Rating

Health hazard:	0
Fire Hazard:	4
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 3.8 Revision Date: 05/27/2016 Print Date: 11/13/2016

SAFETY DATA SHEET

Creation Date 26-Sep-2009 **Revision Date** 26-Jun-2014 **Revision Number** 1

1. Identification

Product Name **Methyl acetate**

Cat No. : **AC371830000; AC371830010; AC371830025; AC371831000**

Synonyms Acetic acid, methyl ester; Methyl ethanoate.

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Entity / Business Name
Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable liquids	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Central nervous system (CNS).	

Label Elements

Signal Word
Danger

Hazard Statements
Highly flammable liquid and vapor
Causes serious eye irritation
May cause drowsiness or dizziness

Precautionary Statements
Prevention
Wash face, hands and any exposed skin thoroughly after handling
Avoid breathing dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Keep container tightly closed
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting/equipment
Use only non-sparking tools
Take precautionary measures against static discharge
Wear protective gloves/protective clothing/eye protection/face protection
Keep cool
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor/physician if you feel unwell
Skin
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
Fire
In case of fire: Use CO2, dry chemical, or foam for extinction
Storage
Store in a well-ventilated place. Keep container tightly closed
Store locked up
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Repeated exposure may cause skin dryness or cracking

3. Composition / information on ingredients

Component	CAS-No	Weight %
Methyl acetate	79-20-9	>95

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Obtain medical attention.

Inhalation Remove from exposure, lie down. Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Obtain medical attention.

Ingestion Clean mouth with water. Do not induce vomiting. Obtain medical attention.

Most important symptoms/effects Breathing difficulties. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Carbon dioxide (CO_2). Dry chemical. Use water spray to cool unopened containers. chemical foam.

Unsuitable Extinguishing Media No information available

Flash Point -10 °C / 14 °F

Method - No information available

Autoignition Temperature 455 °C / 851 °F

Explosion Limits
Upper 16.0%
Lower 3.1%
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Flammable. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Containers may explode when heated.

Hazardous Combustion Products
Carbon monoxide (CO) Carbon dioxide (CO_2)
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
2	3	0	N/A

6. Accidental release measures

Personal Precautions Use personal protective equipment. Ensure adequate ventilation.
Environmental Precautions See Section 12 for additional ecological information.

Methods for Containment and Clean Up Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Keep in suitable, closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.

7. Handling and storage

Handling Avoid contact with skin and eyes. Do not breathe dust. Do not breathe vapors or spray mist. Remove all sources of ignition. Use only non-sparking tools. Wash hands before breaks and immediately after handling the product.

Storage Keep in a dry, cool and well-ventilated place. Keep container tightly closed. Keep away from heat and sources of ignition. Flammables area.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH
Methyl acetate	TWA: 200 ppm STEL: 250 ppm	(Vacated) TWA: 200 ppm (Vacated) TWA: 610 mg/m³ (Vacated) STEL: 250 ppm (Vacated) STEL: 760 mg/m³ TWA: 200 ppm TWA: 610 mg/m³	IDLH: 3100 ppm TWA: 200 ppm TWA: 610 mg/m³ STEL: 250 ppm STEL: 760 mg/m³

Component	Quebec	Mexico OEL (TWA)	Ontario TWAEV
Methyl acetate	TWA: 200 ppm TWA: 606 mg/m³ STEL: 250 ppm STEL: 757 mg/m³	TWA: 200 ppm TWA: 610 mg/m³ STEL: 250 ppm STEL: 760 mg/m³	TWA: 200 ppm STEL: 250 ppm

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health

Engineering Measures Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	aromatic
Odor Threshold	No information available
pH	No information available
Melting Point/Range	-98 °C / -144.4 °F
Boiling Point/Range	57.4 °C / 135.3 °F @ 760 mmHg
Flash Point	-10 °C / 14 °F
Evaporation Rate	No information available
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	16.0%
Lower	3.1%
Vapor Pressure	220 mbar @ 20 °C
Vapor Density	2.8 (Air = 1.0)
Relative Density	0.930
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	455 °C / 851 °F
Decomposition temperature	No information available
Viscosity	0.38 mPa s at 20 °C
Molecular Formula	C3 H6 O2
Molecular Weight	74.08

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Keep away from open flames, hot surfaces and sources of ignition. Excess heat. Incompatible products. Exposure to moisture.

Incompatible Materials Acids, Bases

Hazardous Decomposition Products Carbon monoxide (CO), Carbon dioxide (CO_2)

Hazardous Polymerization No information available.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Methyl acetate	5000 mg/kg (Rat)	5 g/kg (Rabbit)	16000 ppm (Rat) 4 h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Irritating to eyes

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Methyl acetate	79-20-9	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Central nervous system (CNS)

STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects, both acute and delayed Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting

Endocrine Disruptor Information No information available

Other Adverse Effects See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

Do not empty into drains.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Methyl acetate	120 mg/L EC50 > 72 h	295 - 348 mg/L LC50 96 h 250 - 350 mg/L LC50 96 h	EC50 = 6000 mg/L 16 h EC50 = 6100 mg/L 30 min	1026.7 mg/L EC50 = 48 h

Persistence and Degradability No information available

Bioaccumulation/ Accumulation No information available.

Mobility .

Component	log Pow
Methyl acetate	0.18

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No	UN1231
Proper Shipping Name	METHYL ACETATE
Hazard Class	3
Packing Group	II

TDG

UN-No	UN1231
Proper Shipping Name	METHYL ACETATE
Hazard Class	3
Packing Group	II

IATA

UN-No	1231
Proper Shipping Name	METHYL ACETATE
Hazard Class	3
Packing Group	II

IMDG/IMO

UN-No	1231
Proper Shipping Name	METHYL ACETATE
Hazard Class	3
Packing Group	II

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Methyl acetate	X	X	-	201-185-2	-		X	X	X	X	X

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b)

Component	TSCA 12(b)
Methyl acetate	Section 4

SARA 313 Not applicable

SARA 311/312 Hazardous Categorization

Acute Health Hazard	Yes
Chronic Health Hazard	No
Fire Hazard	Yes
Sudden Release of Pressure Hazard	No

Reactive Hazard No

Clean Water Act Not applicable

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA
Not applicable

California Proposition 65 This product does not contain any Proposition 65 chemicals

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Methyl acetate	X	X	X	-	X

U.S. Department of Transportation

Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class B2 Flammable liquid
D2B Toxic materials

16. Other information

Prepared By Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 26-Sep-2009
Revision Date 26-Jun-2014
Print Date 26-Jun-2014
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer

The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS

Fisher Scientific

Part of Thermo Fisher Scientific

SAFETY DATA SHEET

Creation Date 27-Jan-2010 **Revision Date** 02-Oct-2015 **Revision Number** 2

1. Identification

Product Name **Methylene chloride**

Cat No. : **D37-1; D37-4; D37-20; D37-200; D37-200LC; D37-500; D37FB-19; D37FB-50; D37FB-115; D37FB-200; D37POP-19; D37POPB-50; D37POPB-200; D37RB-19; D37RB-50; D37RB-115; D37RB-200; D37RS-19; D37RS-28; D37RS-50; D37RS-115; D37RS-200; D37SK-4; D37SK-4LC; D37SS-28; D37SS-50; D37SS-115; D37SS-200; D37SS-1350**

Synonyms Dichloromethane; DCM

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number
CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Skin Corrosion/irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Carcinogenicity	Category 1B
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Central nervous system (CNS), Respiratory system.	
Specific target organ toxicity - (repeated exposure)	Category 2
Target Organs - Liver, Kidney, Blood.	

Label Elements

Signal Word
Danger

Hazard Statements
Causes skin irritation
Causes serious eye irritation

May cause respiratory irritation
May cause drowsiness or dizziness
May cause cancer
May cause damage to organs through prolonged or repeated exposure

Precautionary Statements
Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wash face, hands and any exposed skin thoroughly after handling
Wear eye/face protection
Do not breathe dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Response
IF exposed or concerned: Get medical attention/advice
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Skin
IF ON SKIN: Wash with plenty of soap and water
If skin irritation occurs: Get medical advice/attention
Take off contaminated clothing and wash before reuse
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)

WARNING! This product contains a chemical known in the State of California to cause cancer, birth defects or other reproductive harm.

3. Composition / information on ingredients

Component	CAS-No	Weight %
Methylene chloride	75-09-2	>99.5
Methyl alcohol	67-56-1	0 - 0.4
Cyclohexene	110-83-8	0 - 0.01
2-Methyl-2-butene	513-35-9	0 - 0.01

4. First-aid measures

General Advice If symptoms persist, call a physician.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Obtain medical attention.

Inhalation Move to fresh air. If breathing is difficult, give oxygen. Obtain medical attention.

Ingestion Do not induce vomiting. Call a physician or Poison Control Center immediately.

Most important symptoms/effects Breathing difficulties. . Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature 556 °C / 1032.8 °F

Explosion Limits
Upper 23 vol %
Lower 13 vol %
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Thermal decomposition can lead to release of irritating gases and vapors. Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products
Carbon monoxide (CO) Carbon dioxide (CO_2) Hydrogen chloride gas Phosgene
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
2	1	0	N/A

6. Accidental release measures

Personal Precautions Use personal protective equipment. Ensure adequate ventilation. Avoid contact with skin, eyes and clothing. Keep people away from and upwind of spill/leak.

Environmental Precautions Should not be released into the environment. See Section 12 for additional ecological information.

Methods for Containment and Clean Up Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

7. Handling and storage

Handling Wear personal protective equipment. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation. Use only under a chemical fume hood.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH
Methylene chloride	TWA: 50 ppm	(Vacated) TWA: 500 ppm (Vacated) STEL: 2000 ppm (Vacated) Ceiling: 1000 ppm TWA: 25 ppm STEL: 125 ppm	IDLH: 2300 ppm
Methyl alcohol	TWA: 200 ppm STEL: 250 ppm Skin	(Vacated) TWA: 200 ppm (Vacated) TWA: 260 mg/m³ (Vacated) STEL: 250 ppm (Vacated) STEL: 325 mg/m³ Skin TWA: 200 ppm TWA: 260 mg/m³	IDLH: 6000 ppm TWA: 200 ppm TWA: 260 mg/m³ STEL: 250 ppm STEL: 325 mg/m³
Cyclohexene	TWA: 300 ppm	(Vacated) TWA: 300 ppm (Vacated) TWA: 1015 mg/m³ TWA: 300 ppm TWA: 1015 mg/m³	IDLH: 2000 ppm TWA: 300 ppm TWA: 1015 mg/m³

Component	Quebec	Mexico OEL (TWA)	Ontario TWAEV
Methylene chloride	TWA: 50 ppm TWA: 174 mg/m³	TWA: 100 ppm TWA: 330 mg/m³ STEL: 500 ppm STEL: 1740 mg/m³	TWA: 50 ppm
Methyl alcohol	TWA: 200 ppm TWA: 262 mg/m³ STEL: 250 ppm STEL: 328 mg/m³ Skin	TWA: 200 ppm TWA: 260 mg/m³ STEL: 250 ppm STEL: 310 mg/m³	TWA: 200 ppm STEL: 250 ppm Skin
Cyclohexene	TWA: 300 ppm TWA: 1010 mg/m³	TWA: 300 ppm TWA: 1015 mg/m³	TWA: 300 ppm

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health

Engineering Measures Use only under a chemical fume hood. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	sweet
Odor Threshold	No information available
pH	Not applicable
Melting Point/Range	-97 °C / -142.6 °F
Boiling Point/Range	39 °C / 102.2 °F
Flash Point	No information available

Evaporation Rate	No information available
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	23 vol %
Lower	13 vol %
Vapor Pressure	20 mmHg @ 3502°C
Vapor Density	2.93 (Air = 1.0)
Specific Gravity	1.33
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	556 °C / 1032.8 °F
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	C H2 Cl2
Molecular Weight	84.93

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products. Excess heat.

Incompatible Materials Strong oxidizing agents, Strong acids, Amines

Hazardous Decomposition Products Carbon monoxide (CO), Carbon dioxide (CO_2), Hydrogen chloride gas, Phosgene

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Methylene chloride	> 2000 mg/kg (Rat)	> 2000 mg/kg (Rat)	53 mg/L (Rat) 6 h 76000 mg/m³ (Rat) 4 h
Methyl alcohol	LD50 = 6200 mg/kg (Rat)	LD50 = 15800 mg/kg (Rabbit)	64000 ppm (Rat) 4 h 83.2 mg/L (Rat) 4 h
Cyclohexene	LD50 = 2400 µL/kg (Rat)	>200 mg/kg (Rat)	>21.6 mg/L/4h (rat)
2-Methyl-2-butene	700-2600 mg/kg (Rat)	>2000 mg/kg (Rat)	LC50 > 61000 ppm (Rat) 4 h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Irritating to eyes and skin

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Methylene chloride	75-09-2	Group 2A	Reasonably Anticipated	A3	X	A3
Methyl alcohol	67-56-1	Not listed	Not listed	Not listed	Not listed	Not listed

Cyclohexene	110-83-8	Not listed	Not listed	Not listed	Not listed	Not listed
2-Methyl-2-butene	513-35-9	Not listed	Not listed	Not listed	Not listed	Not listed

IARC: (International Agency for Research on Cancer)

IARC: (International Agency for Research on Cancer)
Group 1 - Carcinogenic to Humans
Group 2A - Probably Carcinogenic to Humans
Group 2B - Possibly Carcinogenic to Humans

NTP: (National Toxicity Program)

NTP: (National Toxicity Program)
Known - Known Carcinogen
Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen

ACGIH: (American Conference of Governmental Industrial Hygienists)

A1 - Known Human Carcinogen
A2 - Suspected Human Carcinogen
A3 - Animal Carcinogen
ACGIH: (American Conference of Governmental Industrial Hygienists)

Mexico - Occupational Exposure Limits - Carcinogens

Mexico - Occupational Exposure Limits - Carcinogens
A1 - Confirmed Human Carcinogen
A2 - Suspected Human Carcinogen
A3 - Confirmed Animal Carcinogen
A4 - Not Classifiable as a Human Carcinogen
A5 - Not Suspected as a Human Carcinogen

Mutagenic Effects Mutagenic effects have occured in microorganisms.

Reproductive Effects Experiments have shown reproductive toxicity effects on laboratory animals.

Developmental Effects Developmental effects have occurred in experimental animals.

Teratogenicity No information available.

STOT - single exposure Central nervous system (CNS) Respiratory system
STOT - repeated exposure Liver Kidney Blood

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting
Endocrine Disruptor Information No information available

Other Adverse Effects Tumorigenic effects have been reported in experimental animals. See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

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Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Methylene chloride	EC50:>660 mg/L/96h	Pimephales promelas: LC50:193 mg/L/96h	EC50: 1 mg/L/24 h EC50: 2.88 mg/L/15 min	EC50: 140 mg/L/48h
Methyl alcohol	Not listed	Pimephales promelas: LC50 > 10000 mg/L 96h	EC50 = 39000 mg/L 25 min EC50 = 40000 mg/L 15 min EC50 = 43000 mg/L 5 min	EC50 > 10000 mg/L 24h
Cyclohexene	Not listed	Poecillia reticulata: 7.1 mg/L/96h	Not listed	Daphnia: EC50: 5.3 mg/L/48h
2-Methyl-2-butene	Not listed	Not listed	Not listed	EC50: = 3 mg/L, 48h (Daphnia magna)

Persistence and Degradability Persistence is unlikely based on information available.
Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its volatility.

Component	log Pow
Methylene chloride	1.25
Methyl alcohol	-0.74

Cyclohexene	3.27

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

Component	RCRA - U Series Wastes	RCRA - P Series Wastes
Methylene chloride - 75-09-2	U080	-
Methyl alcohol - 67-56-1	U154	-

14. Transport information

DOT

UN-No UN1593
Proper Shipping Name DICHLOROMETHANE
Hazard Class 6.1
Packing Group III

TDG

UN-No UN1593
Proper Shipping Name DICHLOROMETHANE
Hazard Class 6.1
Packing Group III

IATA

UN-No UN1593
Proper Shipping Name Dichloromethane
Hazard Class 6.1
Packing Group III

IMDG/IMO

UN-No UN1593
Proper Shipping Name Dichloromethane
Hazard Class 6.1
Packing Group III

15. Regulatory information

All of the components in the product are on the following Inventory lists: X = listed

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Methylene chloride	X	X	-	200-838-9	-		X	X	X	X	X
Methyl alcohol	X	X	-	200-659-6	-		X	X	X	X	X
Cyclohexene	X	X	-	203-807-8	-		X	X	X	X	X
2-Methyl-2-butene	X	X	-	208-156-3	-		X	X	X	X	X

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b)

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Methylene chloride	75-09-2	>99.5	0.1
Methyl alcohol	67-56-1	0 - 0.4	1.0

SARA 311/312 Hazard Categories

Acute Health Hazard	Yes
Chronic Health Hazard	Yes
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Methylene chloride	-	-	X	X

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Methylene chloride	X		-
Methyl alcohol	X		-

OSHA Occupational Safety and Health Administration

Component	Specifically Regulated Chemicals	Highly Hazardous Chemicals
Methylene chloride	125 ppm STEL 12.5 ppm Action Level 25 ppm TWA	-

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Methylene chloride	1000 lb 1 lb	-
Methyl alcohol	5000 lb	-

California Proposition 65 This product contains the following proposition 65 chemicals

Component	CAS-No	California Prop. 65	Prop 65 NSRL	Category
Methylene chloride	75-09-2	Carcinogen	200 µg/day 50 µg/day	Carcinogen
Methyl alcohol	67-56-1	Developmental	-	Developmental

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Methylene chloride	X	X	X	X	X
Methyl alcohol	X	X	X	X	X
Cyclohexene	X	X	X	-	X
2-Methyl-2-butene	X	X	X	-	-

U.S. Department of Transportation

Reportable Quantity (RQ):	Y
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class D1B Toxic materials
D2A Very toxic materials

16. Other information

Prepared By Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 27-Jan-2010
Revision Date 02-Oct-2015
Print Date 02-Oct-2015
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer
The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS

SAFETY DATA SHEET

Version 6.15
Revision Date 09/07/2024
Print Date 09/08/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : *tert*-Butyl methyl ether

Product Number : 306975
Brand : Sigma-Aldrich
Index-No. : 603-181-00-X
CAS-No. : 1634-04-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquids (Category 2), H225
Skin irritation (Category 2), H315

For the full text of the H-Statements mentioned in this Section, see Section 16.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal Word Danger

Hazard Statements

H225	Highly flammable liquid and vapor.
H315	Causes skin irritation.

Precautionary Statements

P210	Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P264	Wash skin thoroughly after handling.
P280	Wear protective gloves/ eye protection/ face protection.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P403 + P235	Store in a well-ventilated place. Keep cool.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	MTBE Methyl tert-butyl ether
Formula	:	$C_5H_{12}O$
Molecular weight	:	88.15 g/mol
CAS-No.	:	1634-04-4
EC-No.	:	216-653-1
Index-No.	:	603-181-00-X

Component	Classification	Concentration
tert-butyl methyl ether		
	Flam. Liq. 2; Skin Irrit. 2; H225, H315	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

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SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

In case of eye contact
After eye contact: rinse out with plenty of water. Remove contact lenses.

If swallowed
After swallowing: caution if victim vomits. Risk of aspiration! Keep airways free. Pulmonary failure possible after aspiration of vomit. Call a physician immediately.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Carbon dioxide (CO2) Foam Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Carbon oxides
Combustible.
Pay attention to flashback.
Vapors are heavier than air and may spread along floors.
Development of hazardous combustion gases or vapours possible in the event of fire.
Forms explosive mixtures with air at ambient temperatures.

5.3 Advice for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information
Remove container from danger zone and cool with water. Prevent fire extinguishing water from contaminating surface water or the ground water system.

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SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition.
Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains. Risk of explosion.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up with liquid-absorbent material (e.g. Chemizorb®).
Dispose of properly. Clean up affected area.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on protection against fire and explosion
Keep away from open flames, hot surfaces and sources of ignition.Take precautionary measures against static discharge.

Hygiene measures
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Keep container tightly closed in a dry and well-ventilated place. Keep away from heat and sources of ignition.

Storage class
Storage class (TRGS 510): 3: Flammable liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

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Component	CAS-No.	Value	Control parameters	Basis
tert-butyl methyl ether	1634-04-4	TWA	50 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Confirmed animal carcinogen with unknown relevance to humans		
		PEL	40 ppm 144 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

8.2 Exposure controls

Appropriate engineering controls
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 120 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

Body Protection
Flame retardant antistatic protective clothing.

Respiratory protection
Recommended Filter type: Filter type AX
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when vapours/aerosols are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains. Risk of explosion.

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SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Color: colorless
b)	Odor	characteristic
c)	Odor Threshold	0.053 ppm
d)	pH	No data available
e)	Melting point/freezing point	Melting point: -108.6 °C (-163.5 °F) at 1,013 hPa
f)	Initial boiling point and boiling range	55 - 56 °C 131 - 133 °F - lit.
g)	Flash point	-28 °C (-18 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 8.5 %(V) Lower explosion limit: 1.6 %(V)
k)	Vapor pressure	330 hPa at 25 °C (77 °F) - OECD Test Guideline 104
l)	Vapor density	No data available
m)	Density	0.74 g/cm3 at 25 °C (77 °F) - lit.
	Relative density	0.7420 °C
n)	Water solubility	42 g/l at 20 °C (68 °F) - OECD Test Guideline 105
o)	Partition coefficient: n-octanol/water	log Pow: 1.06 at 20 °C (68 °F) - OECD Test Guideline 107 - Bioaccumulation is not expected.
p)	Autoignition temperature	460 °C (860 °F) at 1013.0 hPa - DIN 51794
q)	Decomposition temperature	Distillable in an undecomposed state at normal pressure.
r)	Viscosity	0.409 mm2/s at 40 °C (104 °F) - OECD Test Guideline 114 - 0.464 mm2/s at 20 °C (68 °F) - OECD Test Guideline 114 -
s)	Explosive properties	No data available
t)	Oxidizing properties	none

9.2 Other safety information

Surface tension	72.5 mN/m at 1.07g/l at 21.5 °C (70.7 °F) - Surface tension

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SECTION 10: Stability and reactivity

10.1 Reactivity
Vapors may form explosive mixture with air.

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
Violent reactions possible with:
Oxidizing agents
Strong acids
halogens
Strong bases

10.4 Conditions to avoid
Heat, flames and sparks.
Warming.

10.5 Incompatible materials
rubber, various plastics

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - male and female - > 2,000 mg/kg
(OECD Test Guideline 401)
Symptoms: Nausea, Vomiting, Pulmonary failure possible after aspiration of vomit., Aspiration may cause pulmonary edema and pneumonitis.
LC50 Inhalation - Rat - male and female - 4 h - 85 mg/l - vapor

(OECD Test Guideline 403)
Symptoms: Possible damages:, mucosal irritations
LD50 Dermal - Rat - male and female - > 2,000 mg/kg
(OECD Test Guideline 402)

Skin corrosion/irritation
Skin - Rabbit
Result: Skin irritation - 4 h
(OECD Test Guideline 404)
Remarks: Drying-out effect resulting in rough and chapped skin.

Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation

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(OECD Test Guideline 405)

Respiratory or skin sensitization
Maximization Test - Guinea pig
Result: negative
(OECD Test Guideline 406)

Germ cell mutagenicity
Test Type: In vitro mammalian cell gene mutation test
Test system: Chinese hamster lung cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
Result: negative
Test Type: Ames test
Test system: Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative
Test Type: Mutagenicity (mammal cell test): micronucleus.
Test system: mouse lymphoma cells
Metabolic activation: without metabolic activation
Method: OECD Test Guideline 473
Result: negative

Test Type: unscheduled DNA synthesis assay
Species: Mouse
Cell type: Liver cells
Application Route: inhalation (vapor)
Method: OECD Test Guideline 486
Result: negative

Test Type: Micronucleus test
Species: Mouse
Cell type: Bone marrow
Application Route: inhalation (vapor)
Method: US-EPA
Result: negative

Test Type: Mutagenicity (mammal cell test): chromosome aberration.
Species: Rat
Cell type: Bone marrow
Application Route: inhalation (vapor)
Method: US-EPA
Result: negative

Test Type: Transgenic rodent somatic cell gene mutation assay
Species: Rat
Cell type: Bone marrow
Application Route: inhalation (vapor)
Method: OECD Test Guideline 488
Result: negative

Carcinogenicity

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IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

Repeated dose toxicity - Rat - male and female - Oral - 90 d - NOAEL (No observed adverse effect level) - 3,000 mg/kg
Remarks: Subchronic toxicity

RTECS: KN5250000
Nausea, Vomiting, Dizziness, Central nervous system depression, Aspiration or inhalation may cause chemical pneumonitis., MTBE (methyl-tert-butyl ether) is reported to metabolize to tert-butyl alcohol and formaldehyde by microsomal demethylation, MTBE (methyl-tert-butyl ether) should be considered a "potential human carcinogen" due to an increase in leydig interstitial cell tumors of testes in male rats and an increase in lymphomas, leukemias, and uterine sarcomas in female rats., In another unpublished study MTBE was shown to be carcinogenic due to "increased incidence of a rare type of kidney tumor" in male rats and an "increase in the incidence of hepatocellular adenomas" in female mice.
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Systemic effects:

After absorption of large quantities:

somnolence
Dizziness
agitation, spasms
CNS disorders
narcosis
Unconsciousness

Other dangerous properties can not be excluded.

Handle in accordance with good industrial hygiene and safety practice.

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SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	semi-static test LC50 - Menidia beryllina - 574 mg/l - 96 h (OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	flow-through test EC50 - Americamysis bahia (Mysid) - 187 mg/l - 96 h (US-EPA OPPTS 850.1035)
Toxicity to algae	static test IC50 - Pseudokirchneriella subcapitata (green algae) - 491 mg/l - 96 h
Toxicity to bacteria	static test EC10 - Pseudomonas putida - 710 mg/l - 18 h Remarks: (ECHA)
Toxicity to fish(Chronic toxicity)	flow-through test NOEC - Pimephales promelas (fathead minnow) - 299 mg/l - 31 d Remarks: (ECHA)
	flow-through test NOEC - Pimephales promelas (fathead minnow) - 450 mg/l - 31 d Remarks: (ECHA)
Toxicity to daphnia and other aquatic invertebrates(Chronic toxicity)	flow-through test NOEC - Daphnia magna (Water flea) - 51 mg/l - 21 d (OPPTS 850.1300)

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 28 d Result: 0 % - Not readily biodegradable. (OECD Test Guideline 301D)

12.3 Bioaccumulative potential

Bioaccumulation	Cyprinus carpio (Carp) - 28 d at 25 °C(tert-butyl methyl ether) Bioconcentration factor (BCF): 1.5

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties

No data available

12.7 Other adverse effects

No data available

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SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)
UN number: 2398 Class: 3 Packing group: II
Proper shipping name: Methyl tert-butyl ether
Reportable Quantity (RQ): 1000 lbs
Poison Inhalation Hazard: No

IMDG
UN number: 2398 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: METHYL tert-BUTYL ETHER

IATA
UN number: 2398 Class: 3 Packing group: II
Proper shipping name: Methyl tert-butyl ether

SECTION 15: Regulatory information

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
tert-butyl methyl ether	1634-04-4	1000	1000

SARA 304 Extremely Hazardous Substances Reportable Quantity
This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity
This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Fire Hazard
Acute Health Hazard
Chronic Health Hazard

SARA 313 : The following components are subject to reporting levels established by SARA Title III, Section 313:

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tert-butyl methyl ether	1634-04-4	>= 90 - <= 100 %

US State Regulations

Massachusetts Right To Know

tert-butyl methyl ether 1634-04-4

Pennsylvania Right To Know

tert-butyl methyl ether 1634-04-4

Maine Chemicals of High Concern

tert-butyl methyl ether 1634-04-4

Vermont Chemicals of High Concern

Product does not contain any listed chemicals

Washington Chemicals of High Concern

Product does not contain any listed chemicals

The ingredients of this product are reported in the following inventories:

TSCA : All substances listed as active on the TSCA inventory

TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 6.15 Revision Date: 09/07/2024 Print Date: 09/08/2024

The life science business of Merck KGaA, Darmstadt, Germany
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SAFETY DATA SHEET

Version 5.5
Revision Date 06/02/2016
Print Date 06/21/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : *m*-Xylene

Product Number : 95670
Brand : Sigma-Aldrich
Index-No. : 601-022-00-9

CAS-No. : 108-38-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 3), H226
Acute toxicity, Dermal (Category 4), H312
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Aspiration hazard (Category 1), H304
Acute aquatic toxicity (Category 3), H402
Chronic aquatic toxicity (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H226 Flammable liquid and vapour.
H304 May be fatal if swallowed and enters airways.
H312 Harmful in contact with skin.
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.

H412	Harmful to aquatic life with long lasting effects.

Precautionary statement(s)

P210	Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ eye protection/ face protection.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER/doctor.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P312	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P331	Do NOT induce vomiting.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	1,3-Dimethylbenzene
Formula	:	C_8H_{10}
Molecular weight	:	106.17 g/mol
CAS-No.	:	108-38-3
EC-No.	:	203-576-3
Index-No.	:	601-022-00-9

Hazardous components

Component	Classification	Concentration
m-Xylene		
	Flam. Liq. 3; Acute Tox. 4; Skin Irrit. 2; Eye Irrit. 2A; STOT SE 3; Asp. Tox. 1; Aquatic Acute 3; Aquatic Chronic 3; H226, H304, H312, H315, H319, H335, H412	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): Flammable liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
m-Xylene	108-38-3	TWA	100.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Eye & Upper Respiratory Tract irritation Central Nervous System impairment Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		STEL	150.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Eye & Upper Respiratory Tract irritation Central Nervous System impairment Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		TWA	100.000000 ppm 435.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	150.000000 ppm 655.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	100.000000 ppm 435.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		
		TWA	100.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		STEL	150.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section)		

		Not classifiable as a human carcinogen		
		TWA	100 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		STEL	150 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		TWA	100 ppm 435 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
m-Xylene	108-38-3	Methylhippuric acids	1.5g/g creatinine	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift (As soon as possible after exposure ceases)			
		Methylhippuric acids	1,500.0000 mg/g	Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift (As soon as possible after exposure ceases)			

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 30 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -48 °C (-54 °F) - lit.
f)	Initial boiling point and boiling range	138 - 139 °C (280 - 282 °F) - lit.
g)	Flash point	25.0 °C (77.0 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 7 %(V) Lower explosion limit: 1.1 %(V)
k)	Vapour pressure	8.0 hPa (6.0 mmHg) at 20.0 °C (68.0 °F) 21.3 hPa (16.0 mmHg) at 37.7 °C (99.9 °F)
l)	Vapour density	No data available
m)	Relative density	0.868 g/mL at 25 °C (77 °F)
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	log Pow: 3.2 at 20 °C (68 °F)
p)	Auto-ignition temperature	465.0 °C (869.0 °F) 528.0 °C (982.4 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available

t) Oxidizing properties No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Vapours may form explosive mixture with air.

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - male - 6,602 mg/kg
(OECD Test Guideline 401)

LC50 Inhalation - Rat - male - 4 h - 6700 ppm
(Directive 67/548/EEC, Annex V, B.2.)

LD50 Dermal - Rabbit - male - 12,126 mg/kg

No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Skin irritation - 24 h

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Severe eye irritation - 24 h

Respiratory or skin sensitisation
- Mouse
Result: Does not cause skin sensitisation.
(OECD Test Guideline 429)

Germ cell mutagenicity
No data available

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (m-Xylene)

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

Overexposure may cause reproductive disorder(s) based on tests with laboratory animals.

Specific target organ toxicity - single exposure
Inhalation - May cause respiratory irritation.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
May be fatal if swallowed and enters airways.

Additional Information
RTECS: ZE2275000

Liver injury may occur., Kidney injury may occur., Blood disorders, burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, narcosis, Lung irritation, chest pain, pulmonary edema, Central nervous system depression, Dermatitis, Gastrointestinal disturbance

Kidney -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	mortality LC50 - Fish - 11.23 mg/l - 96 h (OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	Remarks: No data available
Toxicity to algae	Remarks: No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
Due to the distribution coefficient n-octanol/water, accumulation in organisms is not expected.

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Harmful to aquatic life with long lasting effects.

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1307 Class: 3 Packing group: III
Proper shipping name: Xylenes
Reportable Quantity (RQ): 1000 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 1307 Class: 3 Packing group: III EMS-No: F-E, S-D
Proper shipping name: XYLENES

IATA
UN number: 1307 Class: 3 Packing group: III
Proper shipping name: Xylenes

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
m-Xylene	108-38-3	2007-07-01

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
m-Xylene	108-38-3	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
m-Xylene	108-38-3	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
m-Xylene	108-38-3	2007-07-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Asp. Tox.	Aspiration hazard
Eye Irrit.	Eye irritation
Flam. Liq.	Flammable liquids
H226	Flammable liquid and vapour.

H304	May be fatal if swallowed and enters airways.
H312	Harmful in contact with skin.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	3
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	3
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.5 Revision Date: 06/02/2016 Print Date: 06/21/2016

SAFETY DATA SHEET

Version 6.12
Revision Date 09/07/2024
Print Date 09/08/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Naphthalene

Product Number : 147141
Brand : Aldrich
Index-No. : 601-052-00-2
CAS-No. : 91-20-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable solids (Category 2), H228
Carcinogenicity (Category 2), H351
Short-term (acute) aquatic hazard (Category 1), H400

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Long-term (chronic) aquatic hazard (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal Word Warning

Hazard Statements

H228	Flammable solid.
H351	Suspected of causing cancer.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary Statements

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P210	Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	C10H8
Molecular weight	:	128.17 g/mol
CAS-No.	:	91-20-3
EC-No.	:	202-049-5
Index-No.	:	601-052-00-2

Component	Classification	Concentration
Naphthalene		
	Flam. Sol. 2; Carc. 2; Aquatic Acute 1; Aquatic Chronic 1; H228, H351, H400, H410	<= 100 %

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For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Call in physician.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

In case of eye contact
After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

If swallowed
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Water Foam Carbon dioxide (CO2) Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Carbon oxides
Combustible.
Vapors are heavier than air and may spread along floors.
Forms explosive mixtures with air on intense heating.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information
Remove container from danger zone and cool with water. Prevent fire extinguishing water from contaminating surface water or the ground water system.

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operates as MilliporeSigma in the US and Canada

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Avoid inhalation of dusts. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains. Risk of explosion.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up dry. Dispose of properly. Clean up affected area. Avoid generation of dusts.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Work under hood. Do not inhale substance/mixture.

Advice on protection against fire and explosion
Keep away from open flames, hot surfaces and sources of ignition.Take precautionary measures against static discharge.

Hygiene measures
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Keep away from heat and sources of ignition.

Storage class
Storage class (TRGS 510): 4.1B: Flammable solid hazardous materials

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

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SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Naphthalene	91-20-3	TWA	10 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption		
		TWA	10 ppm 50 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	15 ppm 75 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	10 ppm 50 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		PEL	0.1 ppm 0.5 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		Skin		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Naphthalene	91-20-3	1-Naphthol + 2-Naphthol			ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift (As soon as possible after exposure ceases)			

8.2 Exposure controls

Appropriate engineering controls

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Full contact
Material: Nitrile rubber

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Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

Body Protection
Flame retardant antistatic protective clothing.

Respiratory protection
Recommended Filter type: Filter A-(P3)
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when dusts are generated. Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains. Risk of explosion.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: flakes, granules Color: white
b)	Odor	aromatic
c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/ range: 80 - 82 °C (176 - 180 °F) - lit.
f)	Initial boiling point and boiling range	218 °C 424 °F - lit.
g)	Flash point	78.5 °C (173.3 °F) - closed cup - ISO 2719
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	The substance or mixture is a flammable solid with the category 2. - Flammability (solids)
j)	Upper/lower flammability or	Upper explosion limit: 5.9 %(V) Lower explosion limit: 0.9 %(V)

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	explosive limits	
k)	Vapor pressure	0.072 hPa at 20 °C (68 °F) - OECD Test Guideline 104
l)	Vapor density	No data available
m)	Density	1.08 g/cm3 at 24.7 °C (76.5 °F) - OECD Test Guideline 109
	Relative density	No data available
n)	Water solubility	0.0308 g/l at 25 °C (77 °F) - OECD Test Guideline 105 - slightly soluble
o)	Partition coefficient: n-octanol/water	log Pow: 3.4 at 25 °C (77 °F) - OECD Test Guideline 107 - Bioaccumulation is not expected.
p)	Autoignition temperature	526 - 587 °C (979 - 1089 °F) at 1,013 hPa - DIN 51794
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	none

9.2 Other safety information

Surface tension	31.8 mN/m at 100.0 °C (212.0 °F)

SECTION 10: Stability and reactivity

10.1 Reactivity

Forms explosive mixtures with air on intense heating.
A range from approx. 15 Kelvin below the flash point is to be rated as critical.
The following applies in general to flammable organic substances and mixtures: in correspondingly fine distribution, when whirled up a dust explosion potential may generally be assumed.

10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions

Violent reactions possible with:
Oxidizing agents
chromium(VI) oxide
benzoyl chloride
aluminium chloride
Risk of explosion with:
nitrogen oxides

10.4 Conditions to avoid

Heat, flames and sparks.
Strong heating.

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10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
Oral: No data available
LC50 Inhalation - Rat - male and female - 4 h - > 0.4 mg/l - vapor

(OECD Test Guideline 403)
LD50 Dermal - Rabbit - 20,000 mg/kg
Remarks: (RTECS)

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation - 24 h
Remarks: (ECHA)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation - 24 h
Remarks: (ECHA)

Respiratory or skin sensitization
Maximization Test - Guinea pig
Result: negative
(OECD Test Guideline 406)

Germ cell mutagenicity
Test Type: Mutagenicity (mammal cell test): chromosome aberration.
Test system: Chinese hamster ovary cells
Metabolic activation: Metabolic activation
Method: OECD Test Guideline 473
Result: positive
Test Type: Ames test
Test system: Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative

Test Type: unscheduled DNA synthesis assay
Species: Rat
Cell type: Liver cells
Application Route: Oral
Method: OECD Test Guideline 486
Result: negative

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Test Type: Micronucleus test
Species: Mouse
Cell type: Bone marrow
Application Route: Intraperitoneal
Method: US-EPA
Result: negative
Remarks: (ECHA)

Carcinogenicity
Suspected of causing cancer.

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Naphthalene)

No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC. (Naphthalene)

NTP: RAHC - Reasonably anticipated to be a human carcinogen (Naphthalene)

No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP. (Naphthalene)

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

Repeated dose toxicity - Rat - male and female - Oral - 91 Days - NOAEL (No observed adverse effect level) - 200 mg/kg - LOAEL (Lowest observed adverse effect level) - 400 mg/kg

Repeated dose toxicity - Mouse - male and female - Oral - 90 Days - NOAEL (No observed adverse effect level) - 100 mg/kg

Repeated dose toxicity - Rat - male and female - Dermal - 90 Days - NOAEL (No observed adverse effect level) - 1,000 mg/kg

Repeated dose toxicity - Rat - male and female - inhalation (vapor) - 90 Days - NOAEL (No observed adverse effect level) - 300 mg/kg

RTECS: QJ0525000
Absorption into the body leads to the formation of methemoglobin which in sufficient concentration causes cyanosis. Onset may be delayed 2 to 4 hours or longer., Naphthalene is retinotoxic and systemic absorption of its vapors above 15ppm, may result in:, cataracts,

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optic neuritis, corneal injury, Eye irritation, Ingestion may provoke the following symptoms:, hemolytic anemia, hemoglobinuria, Nausea, Headache, Vomiting, Gastrointestinal disturbance, Convulsions, anemia, Kidney injury may occur., Seizures., Coma.
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

After absorption:

Headache
Stomach/intestinal disorders
Tremors
Convulsions
Changes in the blood count

Other dangerous properties can not be excluded.

This substance should be handled with particular care.

Heart -

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	flow-through test LC50 - Oncorhynchus mykiss (rainbow trout) - 1.6 mg/l - 96 h (OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	static test EC50 - Daphnia magna (Water flea) - 2.16 mg/l - 48 h (OECD Test Guideline 202)
Toxicity to algae	static test EC50 - Pseudokirchneriella subcapitata (green algae) - 2.96 mg/l - 4 h (US-EPA) Remarks: (ECHA)
Toxicity to fish(Chronic toxicity)	flow-through test LC50 - Oncorhynchus kisutch (coho salmon) - 2.1 mg/l - 96 h Remarks: (ECHA)
	flow-through test NOEC - Oncorhynchus kisutch (coho salmon) - 0.37 mg/l - 40 Days Remarks: (ECHA)
Toxicity to daphnia and other aquatic invertebrates(Chronic toxicity)	static test NOEC - Daphnia pulex (Water flea) - 0.59 mg/l - 125 d Remarks: (ECHA)

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12.2 Persistence and degradability

Biodegradability aerobic - Exposure time 28 d
Result: 2 % - Not readily biodegradable.
(OECD Test Guideline 302C)

12.3 Bioaccumulative potential

Bioaccumulation Cyprinus carpio (Carp) - 56 d
at 25 °C(Naphthalene)

Bioconcentration factor (BCF): 36.5 - 168
(OECD Test Guideline 305)

Remarks: Bioaccumulation is unlikely.

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties

No data available

12.7 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)

UN number: 1334 Class: 4.1 Packing group: III
Proper shipping name: Naphthalene, refined
Reportable Quantity (RQ): 100 lbs
Marine pollutant: yes Poison Inhalation Hazard: No

IMDG

UN number: 1334 Class: 4.1 Packing group: III EMS-No: F-A, S-G
Proper shipping name: NAPHTHALENE, REFINED

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Marine pollutant : yes

IATA
UN number: 1334 Class: 4.1 Packing group: III
Proper shipping name: Naphthalene, refined

SECTION 15: Regulatory information

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
Naphthalene	91-20-3	100	100

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Fire Hazard
Acute Health Hazard
Chronic Health Hazard

SARA 313 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

US State Regulations

Massachusetts Right To Know

Naphthalene 91-20-3

Maine Chemicals of High Concern

Product does not contain any listed chemicals

Vermont Chemicals of High Concern

Product does not contain any listed chemicals

Washington Chemicals of High Concern

Product does not contain any listed chemicals

The ingredients of this product are reported in the following inventories:

TSCA : All substances listed as active on the TSCA inventory

TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

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SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.12 Revision Date: 09/07/2024 Print Date: 09/08/2024

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SAFETY DATA SHEET

Version 4.4
Revision Date 11/04/2015
Print Date 12/17/2015

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Butylbenzene

Product Number : B90203
Brand : Aldrich

CAS-No. : 104-51-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 3), H226
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)
H226 Flammable liquid and vapour.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P233 Keep container tightly closed.
P240 Ground/bond container and receiving equipment.
P241 Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242 Use only non-sparking tools.
P243 Take precautionary measures against static discharge.
P273 Avoid release to the environment.
P280 Wear protective gloves/ protective clothing/ eye protection/ face

	protection.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P391	Collect spillage.
P403 + P235	Store in a well-ventilated place. Keep cool.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : 1-Phenylbutane

Formula : $C_{10}H_{14}$
Molecular weight : 134.22 g/mol
CAS-No. : 104-51-8
EC-No. : 203-209-7

Hazardous components

Component	Classification	Concentration
Butylbenzene		
	Flam. Liq. 3; Aquatic Acute 1; Aquatic Chronic 1; H226, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

5.2 Special hazards arising from the substance or mixture
Carbon oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact

Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Impervious clothing, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid, clear Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -88 °C (-126 °F) - lit.
f)	Initial boiling point and boiling range	183 °C (361 °F) - lit.
g)	Flash point	59.0 °C (138.2 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 5.8 %(V) Lower explosion limit: 0.8 %(V)
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	0.86 g/cm3 at 25 °C (77 °F)
n)	Water solubility	insoluble
o)	Partition coefficient: n-octanol/water	log Pow: 4.26
p)	Auto-ignition temperature	412.0 °C (773.6 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available

s) Explosive properties No data available

t) Oxidizing properties No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: CY9070000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to daphnia and other aquatic invertebrates	Immobilization EC50 - Daphnia magna (Water flea) - 0.34 mg/l - 48 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 2709 Class: 3 Packing group: III
Proper shipping name: Butyl benzenes
Marine pollutant:yes
Poison Inhalation Hazard: No

IMDG
UN number: 2709 Class: 3 Packing group: III EMS-No: F-E, S-D
Proper shipping name: BUTYLBENZENES
Marine pollutant:yes

IATA
UN number: 2709 Class: 3 Packing group: III
Proper shipping name: Butylbenzenes

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Fire Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Butylbenzene	104-51-8	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Butylbenzene	104-51-8	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Butylbenzene	104-51-8	1993-04-24

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Flam. Liq.	Flammable liquids
H226	Flammable liquid and vapour.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	0
Chronic Health Hazard:	
Flammability:	2
Physical Hazard	0

NFPA Rating

Health hazard:	0
Fire Hazard:	2
Reactivity Hazard:	0

Further information
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Preparation Information
Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.4 Revision Date: 11/04/2015 Print Date: 12/17/2015

Safety data sheet

according to 1907/2006/EC, Article 31

Printing date 24.08.2020 *Version number 1* *Revision: 24.08.2020*

SECTION 1: Identification of the substance/mixture and of the company/undertaking

· **1.1 Product identifier**

· **Product name:** **N-Ethyl-N-(2-hydroxyethyl)perfluorooctanesulfonamide**

· **Part number:** DRE-C13342360
· **CAS Number:**
1691-99-2
· **EC number:**
216-887-4
· **1.2 Relevant identified uses of the substance or mixture and uses advised against**
No further relevant information available.
· **Application of the substance / the mixture** Reference material for laboratory use only

· **1.3 Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
LGC Limited
Queens Road
Teddington
Middlesex TW11 0LY
UNITED KINGDOM

Tel :+44 (0) 20 8943 7000
Fax :+44 (0) 20 8943 2767
eMail : gb@lgcstandards.com
Web : www.lgcstandards.com

· **Further information obtainable from:**
Product safety department
eMail : sds-request@lgcgroup.com
· **1.4 Emergency telephone number:**
For Hazardous Materials or Dangerous Goods Incident
Spill, Leak, Fire Exposure, or Accident
Call CHEMTREC:
USA & Canada 1-800-424-9300
Rest of the world +1 703-741-5970

SECTION 2: Hazards identification

· **2.1 Classification of the substance or mixture**
· **Classification according to Regulation (EC) No 1272/2008**

GHS06 skull and crossbones

Acute Tox. 3	H301	Toxic if swallowed.

GHS08 health hazard

Carc. 2	H351	Suspected of causing cancer.
Repr. 1B	H360D-H362	May damage the unborn child. May cause harm to breast-fed children.
STOT RE 1	H372	Causes damage to organs through prolonged or repeated exposure.

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***Product name:* N-Ethyl-N-(2-hydroxyethyl)perfluorooctanesulfonamide**

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GHS09 environment

Aquatic Chronic 2 H411 *Toxic to aquatic life with long lasting effects.*

GHS07

Acute Tox. 4 H332 *Harmful if inhaled.*

· ***2.2 Label elements***

· ***Labelling according to Regulation (EC) No 1272/2008***

The substance is classified and labelled according to the CLP regulation.

· ***Hazard pictograms***

GHS06 GHS08 GHS09

· ***Signal word*** *Danger*

· ***Hazard statements***

H301 *Toxic if swallowed.*
H332 *Harmful if inhaled.*
H351 *Suspected of causing cancer.*
H360D-H362 *May damage the unborn child. May cause harm to breast-fed children.*
H372 *Causes damage to organs through prolonged or repeated exposure.*
H411 *Toxic to aquatic life with long lasting effects.*

· ***Precautionary statements***

P260 *Do not breathe dusts or mists.*
P263 *Avoid contact during pregnancy and while nursing.*
P280 *Wear protective gloves/protective clothing/eye protection/face protection.*
P301+P310 *IF SWALLOWED: Immediately call a POISON CENTER/ doctor.*
P405 *Store locked up.*
P501 *Dispose of contents/container in accordance with local/regional/national/international regulations.*

· ***Additional information:***

Restricted to professional users.

· ***2.3 Other hazards***

· ***Results of PBT and vPvB assessment***

· ***PBT:*** *Not applicable.*

· ***vPvB:*** *Not applicable.*

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Product name: **N-Ethyl-N-(2-hydroxyethyl)perfluorooctanesulfonamide**

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SECTION 3: Composition/information on ingredients

· **3.1 Chemical characterisation: Substances**
· **CAS No. Description**
1691-99-2 N-Ethyl perfluorooctane sulfonamide ethanol
· **Identification number(s)** None
· **EC number:** 216-887-4
· **RTECS:** RG9701350
· **Additional information:** For the wording of the listed hazard phrases refer to section 16.

SECTION 4: First aid measures

· **4.1 Description of first aid measures**
· **General information:**
Immediately remove any clothing soiled by the product.
Symptoms of poisoning may occur even after several hours; therefore medical observation for at least 48 hours after the accident is recommended.
In case of irregular breathing or respiratory arrest provide artificial respiration.
· **After inhalation:**
Supply fresh air. If required, provide artificial respiration. Keep patient warm. Consult doctor if symptoms persist.
In case of unconsciousness place patient in recovery position for transport.
Seek medical treatment.
· **After skin contact:** Immediately wash with water and soap and rinse thoroughly.
· **After eye contact:** Rinse opened eye for several minutes under running water. Then consult a doctor.
· **After swallowing:**
Rinse mouth. Do not induce vomiting.
Call for a doctor immediately.
· **4.2 Most important symptoms and effects, both acute and delayed** No further relevant information available.
· **4.3 Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

SECTION 5: Firefighting measures

· **5.1 Extinguishing media**
· **Suitable extinguishing agents:** Use fire extinguishing methods suitable for surrounding conditions.
· **5.2 Special hazards arising from the substance or mixture**
Formation of toxic gases is possible during heating or in case of fire.
· **5.3 Advice for firefighters**
· **Protective equipment:**
Mouth respiratory protective device.
Wear self-contained respiratory protective device.

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SECTION 6: Accidental release measures

· **6.1 Personal precautions, protective equipment and emergency procedures** Avoid formation of dust.
· **6.2 Environmental precautions:**
Inform respective authorities in case of seepage into water course or sewage system.
Do not allow to enter sewers/ surface or ground water.
· **6.3 Methods and material for containment and cleaning up:**
Dispose of contaminated material as waste according to item 13.
Ensure adequate ventilation.
· **6.4 Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

SECTION 7: Handling and storage

· **7.1 Precautions for safe handling**
Ensure good ventilation/extraction at the workplace.
Remove dust thoroughly.
Store in cool, dry place in tightly closed receptacles.
· **Information about fire - and explosion protection:** No special measures required.

· **7.2 Conditions for safe storage, including any incompatibilities**
· **Storage:**
· **Requirements to be met by storerooms and receptacles:**
Please refer to the manufacturer's certificate for specific storage and transport temperature conditions.
Store only in the original receptacle unless other advice is given on the CoA.
Keep container in a well-ventilated place. Keep away from sources of ignition and heat.
· **Information about storage in one common storage facility:** Store away from foodstuffs.
· **Further information about storage conditions:** Keep container tightly sealed.
· **7.3 Specific end use(s)** No further relevant information available.

SECTION 8: Exposure controls/personal protection

· **Additional information about design of technical facilities:** No further data; see item 7.

· **8.1 Control parameters**
· **Ingredients with limit values that require monitoring at the workplace:** Not required.
· **Additional information:** Lists used were valid at the time of SDS preparation.

· **8.2 Exposure controls**
· **Personal protective equipment:**
· **General protective and hygienic measures:**
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing
Wash hands before breaks and at the end of work.
Store protective clothing separately.

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· ***Respiratory protection:***
In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use self-contained respiratory protective device.
· ***Protection of hands:***
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
The protective gloves to be used must comply with the specifications of EC Directive 89/686/EEC and the related standard EN374

Protective gloves

· ***Material of gloves*** *Fluorocarbon rubber (Viton)*
· ***Penetration time of glove material***
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.
· ***Eye protection:***

Tightly sealed goggles

SECTION 9: Physical and chemical properties

· ***9.1 Information on basic physical and chemical properties***	
· ***General Information***	
· ***Appearance:***	
Form:	*Solid*
Colour:	*White*
· ***Odour:***	*Odourless*
· ***Odour threshold:***	*Not determined.*
· ***pH-value:***	*Not applicable.*
· ***Change in condition***	
Melting point/freezing point:	*55-60 °C*
Initial boiling point and boiling range:	*Not determined.*
· ***Flash point:***	*Not applicable.*
· ***Flammability (solid, gas):***	*Not determined.*
· ***Ignition temperature:***	*Not determined*
· ***Decomposition temperature:***	*Not determined.*
· ***Auto-ignition temperature:***	*Not determined.*

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· **Explosive properties:**	Not determined.
· **Explosion limits:**	
Lower:	Not determined.
Upper:	Not determined.
· **Vapour pressure:**	Not applicable.
· **Density:**	Not determined.
· **Relative density**	Not determined.
· **Vapour density**	Not applicable.
· **Evaporation rate**	Not applicable.
· **Solubility in / Miscibility with**	Chloroform (Slightly), DMSO, Ethyl Acetate (Slightly), Methanol (Slightly)
· **water:**	Not determined.
· **Partition coefficient: n-octanol/water:**	Not determined.
· **Viscosity:**	
Dynamic:	Not applicable.
Kinematic:	Not applicable.
· **9.2 Other information**	No further relevant information available.

SECTION 10: Stability and reactivity

· **10.1 Reactivity**
Stable under normal conditions.
No further relevant information available.
· **10.2 Chemical stability** Stable under normal conditions.
· **Thermal decomposition / conditions to be avoided:**
Formation of toxic gases is possible during heating or in case of fire.
· **10.3 Possibility of hazardous reactions** No dangerous reactions known.
· **10.4 Conditions to avoid** Heat.
· **10.5 Incompatible materials:** Strong oxidizing agents.
· **10.6 Hazardous decomposition products:**
Formation of toxic gases is possible during heating or in case of fire.

SECTION 11: Toxicological information

· **11.1 Information on toxicological effects**
· **Acute toxicity**
Toxic if swallowed.
Harmful if inhaled.
· **Primary irritant effect:**
· **Skin corrosion/irritation** Based on available data, the classification criteria are not met.
· **Serious eye damage/irritation** Based on available data, the classification criteria are not met.
· **Respiratory or skin sensitisation** Based on available data, the classification criteria are not met.

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· ***CMR effects (carcinogenity, mutagenicity and toxicity for reproduction)***
Carc. 2, Repr. 1B
· ***Germ cell mutagenicity*** *Based on available data, the classification criteria are not met.*
· ***Carcinogenicity***
Suspected of causing cancer.
· ***Reproductive toxicity***
May damage the unborn child. May cause harm to breast-fed children.
· ***STOT-single exposure*** *Based on available data, the classification criteria are not met.*
· ***STOT-repeated exposure***
Causes damage to organs through prolonged or repeated exposure.
· ***Aspiration hazard*** *Based on available data, the classification criteria are not met.*

SECTION 12: Ecological information

· ***12.1 Toxicity***
· ***Aquatic toxicity:*** *No further relevant information available.*
· ***12.2 Persistence and degradability*** *No further relevant information available.*
· ***12.3 Bioaccumulative potential*** *No further relevant information available.*
· ***12.4 Mobility in soil*** *No further relevant information available.*
· ***Ecotoxicological effects:***
· ***Remark:*** *Toxic for fish*
· ***Additional ecological information:***
· ***General notes:***
Water hazard class 3 (German Regulation) (Self-assessment): extremely hazardous for water
Do not allow product to reach ground water, water course or sewage system, even in small quantities.
Danger to drinking water if even extremely small quantities leak into the ground.
Also poisonous for fish and plankton in water bodies.
Toxic for aquatic organisms
· ***12.5 Results of PBT and vPvB assessment***
· ***PBT:*** *Not applicable.*
· ***vPvB:*** *Not applicable.*
· ***12.6 Other adverse effects*** *No further relevant information available.*

SECTION 13: Disposal considerations

· ***13.1 Waste treatment methods***
· ***Recommendation***
Must not be disposed of together with household garbage. Do not allow product to reach sewage system.
· ***European waste catalogue***
Waste disposal key numbers from EWC have to be assigned depending on origin and processing.

· ***Uncleaned packaging:***
· ***Recommendation:*** *Dispose of in accordance with national regulations.*

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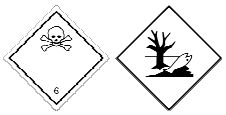
SECTION 14: Transport information

· ***14.1 UN-Number***	
· ***ADR, IMDG, IATA***	*UN2811*
· ***ADR***	*2811 TOXIC SOLID, ORGANIC, N.O.S. (N-Ethyl perfluorooctane sulfonamide ethanol), ENVIRONMENTALLY HAZARDOUS*
· ***IMDG***	*TOXIC SOLID, ORGANIC, N.O.S. (N-Ethyl perfluorooctane sulfonamide ethanol), MARINE POLLUTANT*
· ***IATA***	*TOXIC SOLID, ORGANIC, N.O.S. (N-Ethyl perfluorooctane sulfonamide ethanol)*
· ***14.3 Transport hazard class(es)***	
· ***ADR, IMDG***	
· ***Class***	*6.1 Toxic substances.*
· ***Label***	*6.1*
· ***IATA***	
· ***Class***	*6.1 Toxic substances.*
· ***Label***	*6.1*
· ***14.4 Packing group***	
· ***ADR, IMDG, IATA***	*III*
· ***14.5 Environmental hazards:***	*Environmentally hazardous substance, solid; Marine Pollutant*
· ***Marine pollutant:***	*Symbol (fish and tree)*
· ***Special marking (ADR):***	*Symbol (fish and tree)*
· ***14.6 Special precautions for user***	*Warning: Toxic substances.*
· ***Danger code (Kemler):***	*60*
· ***EMS Number:***	*F-A,S-A*
· ***Stowage Category***	*A*
· ***14.7 Transport in bulk according to Annex II of Marpol and the IBC Code***	*Not applicable.*

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Product name: **N-Ethyl-N-(2-hydroxyethyl)perfluorooctanesulfonamide**

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· ***Transport/Additional information:***

· ***ADR***	
· ***Limited quantities (LQ)***	*5 kg*
· ***Excepted quantities (EQ)***	*Code: E1* *Maximum net quantity per inner packaging: 30 g* *Maximum net quantity per outer packaging: 1000 g*
· ***Transport category***	*2*
· ***Tunnel restriction code***	*E*
· ***UN "Model Regulation":***	*UN 2811 TOXIC SOLID, ORGANIC, N.O.S. (N-ETHYL PERFLUOROOCTANE SULFONAMIDE ETHANOL), 6.1, III, ENVIRONMENTALLY HAZARDOUS*

SECTION 15: Regulatory information

· ***15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture***

· ***Directive 2012/18/EU***
· ***Named dangerous substances - ANNEX I*** *Substance is not listed.*
· ***Seveso category*** *E2 Hazardous to the Aquatic Environment*
· ***Qualifying quantity (tonnes) for the application of lower-tier requirements*** *200 t*
· ***Qualifying quantity (tonnes) for the application of upper-tier requirements*** *500 t*
· ***Regulation (EU) No 649/2012***
Annex I Part 1
Annex I Part 3
· ***15.2 Chemical safety assessment:*** *A Chemical Safety Assessment has not been carried out.*

SECTION 16: Other information

The information in this safety data sheet (SDS) has been prepared with due care and is true and accurate to the best of our knowledge. The user must determine the suitability of the information for its particular purpose, ensure compliance with existing laws and regulations, and be aware that other or additional safety or performance considerations may arise when using, handling and/ or storing the material. The information in this SDS does not purport to be all inclusive or a guarantee as to the properties of the material supplied, and should be used only as a guide. LGC makes no warranties or representations as to the accuracy and completeness of the information contained herein, shall not be held responsible for the suitability of this information for the user's intended purposes or the consequences of such use, and shall not be liable for any damage or loss, howsoever arising, direct or otherwise.

· ***Abbreviations and acronyms:***
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
GHS: Globally Harmonised System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
PBT: Persistent, Bioaccumulative and Toxic

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vPvB: very Persistent and very Bioaccumulative
Acute Tox. 3: Acute toxicity – Category 3
Acute Tox. 4: Acute toxicity – Category 4
Carc. 2: Carcinogenicity – Category 2
Repr. 1B: Reproductive toxicity – Category 1B
STOT RE 1: Specific target organ toxicity (repeated exposure) – Category 1
Aquatic Chronic 2: Hazardous to the aquatic environment - long-term aquatic hazard – Category 2

· ***Sources***
Tables 3.1 and 3.2 from Annex 6 of EC 1272/2008, EC 1907/2006, EH40/2005 as amended 2011, Registry of Toxic Effects of Chemical Substances (RTECS), The Dictionary of Substances and their Effects, 1st Edition, IUCLID.

· ***Data compared to the previous version altered.*** *All sections have been updated.*

SAFETY DATA SHEET

Creation Date 26-Oct-2009 **Revision Date** 02-Apr-2014 **Revision Number** 1

1. Identification

Product Name **n-Hexane**

Cat No. : **AC326920000; AC326920010; AC326920025; AC326921000; AC326922500**

Synonyms Hex

Recommended Use Laboratory chemicals

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Entity / Business Name
Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 /
Europe call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 /
Europe: +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 /
Europe:001-703-527-3887

2. Hazard(s) identification

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable liquids	Category 2
Skin Corrosion/irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Reproductive Toxicity	Category 2
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system, Central nervous system (CNS).	
Specific target organ toxicity - (repeated exposure)	Category 1
Target Organs - Liver, Heart, Blood.	
Aspiration Toxicity	Category 1

Label Elements

Signal Word
Danger

Hazard Statements
Highly flammable liquid and vapor

May be fatal if swallowed and enters airways
Causes skin irritation
Causes serious eye irritation
May cause respiratory irritation
May cause drowsiness or dizziness
Suspected of damaging fertility
Causes damage to organs through prolonged or repeated exposure

Precautionary Statements
Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wash face, hands and any exposed skin thoroughly after handling
Wear eye/face protection
Do not breathe dust/fume/gas/mist/vapors/spray
Do not eat, drink or smoke when using this product
Use only outdoors or in a well-ventilated area
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Keep container tightly closed
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting/equipment
Use only non-sparking tools
Take precautionary measures against static discharge
Keep cool
Response
IF exposed or concerned: Get medical attention/advice
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Skin
If skin irritation occurs: Get medical advice/attention
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
Wash contaminated clothing before reuse
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention.
Ingestion
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
Do NOT induce vomiting
Fire
In case of fire: Use CO2, dry chemical, or foam for extinction
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Disposal
Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)
Toxic to aquatic life with long lasting effects

3. Composition / information on ingredients

Haz/Non-haz

Component	CAS-No	Weight %
Hexane	110-54-3	>95

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Obtain medical attention.

Inhalation Move to fresh air. If breathing is difficult, give oxygen. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with a respiratory medical device. Obtain medical attention. Aspiration into lungs can produce severe lung damage.

Ingestion Do not induce vomiting. Call a physician or Poison Control Center immediately. If vomiting occurs, lean victim forward to reduce the risk of aspiration.

Most important symptoms/effects Breathing difficulties. . Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting.

Notes to Physician Treat symptomatically.

5. Fire-fighting measures

Suitable Extinguishing Media CO_2, dry chemical, dry sand, alcohol-resistant foam. Cool closed containers exposed to fire with water spray.

Unsuitable Extinguishing Media Water may be ineffective, This material is lighter than water and insoluble in water. The fire could easily be spread by the use of water in an area where the water cannot be contained.

Flash Point -22°C / -7.6°F

Method - No information available

Autoignition Temperature 223°C / 433.4°F

Explosion Limits

Upper 7.5 vol %

Lower 1.1 vol %

Sensitivity to Mechanical Impact No information available

Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical

Flammable. Risk of ignition. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Containers may explode when heated.

Hazardous Combustion Products Carbon monoxide (CO), Carbon dioxide (CO_2).

Protective Equipment and Precautions for Firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health	Flammability	Instability	Physical hazards
2	3	0	N/A

6. Accidental release measures

Personal Precautions Use personal protective equipment. Ensure adequate ventilation. Evacuate personnel to safe areas. Remove all sources of ignition. Take precautionary measures against static discharges.

Environmental Precautions Do not flush into surface water or sanitary sewer system. Avoid release to the environment. Collect spillage.

Methods for Containment and Clean Up Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment. Take precautionary measures against static discharges.

7. Handling and storage

Handling Wear personal protective equipment. Do not get in eyes, on skin, or on clothing. Do not breathe vapors or spray mist. Keep away from open flames, hot surfaces and sources of ignition. Use only non-sparking tools. Use explosion-proof equipment. Take precautionary measures against static discharges. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat and sources of ignition. Flammables area.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH
Hexane	TWA: 50 ppm Skin	(Vacated) TWA: 50 ppm (Vacated) TWA: 180 mg/m^3 TWA: 500 ppm TWA: 1800 mg/m^3	IDLH: 1100 ppm TWA: 50 ppm TWA: 180 mg/m^3

Component	Quebec	Mexico OEL (TWA)	Ontario TWAEV
Hexane	TWA: 50 ppm TWA: 176 mg/m^3 Skin	TWA: 50 ppm TWA: 176 mg/m^3	TWA: 50 ppm Skin

Legend
ACGIH *- American Conference of Governmental Hygienists*
OSHA *- Occupational Safety and Health Administration*
NIOSH IDLH: *The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health*

Engineering Measures Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location. Use explosion-proof electrical/ventilating/lighting/equipment.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	Petroleum distillates
Odor Threshold	No information available.
pH	No information available.
Melting Point/Range	-95°C / -139°F
Boiling Point/Range	69°C / 156.2°F@ 760 mmHg
Flash Point	-22°C / -7.6°F
Evaporation Rate	No information available.
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	7.5 vol %
Lower	1.1 vol %
Vapor Pressure	160 mbar @ 20 °C
Vapor Density	2.97
Relative Density	0.659
Solubility	Insoluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	223°C / 433.4°F
Decomposition temperature	No information available.
Viscosity	0.31 mPa s at 20 °C
Molecular Formula	C6 H14
Molecular Weight	86.18

10. Stability and reactivity

Reactive Hazard None known, based on information available.

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products. Heat, flames and sparks. Exposure to light. Keep away from open flames, hot surfaces and sources of ignition.

Incompatible Materials Strong oxidizing agents, Halogens

Hazardous Decomposition Products Carbon monoxide (CO), Carbon dioxide (CO_2)

Hazardous Polymerization Hazardous polymerization does not occur

Hazardous Reactions None under normal processing

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Hexane	25 g/kg (Rat)	3000 mg/kg (Rabbit)	48000 ppm (Rat) 4 h

Toxicologically Synergistic Products No information available.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Irritating to eyes and skin

Sensitization No information available.

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Hexane	110-54-3	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects Mutagenic effects have occurred in experimental animals.

Reproductive Effects Experiments have shown reproductive toxicity effects on laboratory animals.

Developmental Effects Developmental effects have occurred in experimental animals.

Teratogenicity Teratogenic effects have occurred in experimental animals..

STOT - single exposure Respiratory system, Central nervous system (CNS).

STOT - repeated exposure Liver, Heart, Blood.

Aspiration hazard No information available.

Symptoms / effects, both acute and delayed Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting.

Endocrine Disruptor Information No information available

Other Adverse Effects Tumorigenic effects have been reported in experimental animals.. See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. The product contains following substances which are hazardous for the environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Hexane	Not listed	2.1 - 2.98 mg/L LC50 96 h	Not listed	EC50: 3.87 mg/L/48h

Persistence and Degradability Persistence is unlikely, based on information available.

Bioaccumulation/ Accumulation No information available

Mobility Will likely be mobile in the environment due to its volatility.

Component	log Pow
Hexane	4.11

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No	UN1208
Proper Shipping Name	Hexanes
Hazard Class	3
Packing Group	II

TDG

UN-No	UN1208
Proper Shipping Name	HEXANES
Hazard Class	3
Packing Group	II

IATA

UN-No	UN1208
Proper Shipping Name	Hexanes
Hazard Class	3
Packing Group	II

IMDG/IMO

UN-No	UN1208
Proper Shipping Name	Hexanes
Hazard Class	3
Packing Group	II

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Hexane	X	X	-	203-777-6	-		X	X	X	X	X

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Hexane	110-54-3	>95	1.0

SARA 311/312 Hazardous Categorization

Acute Health Hazard	Yes
Chronic Health Hazard	Yes
Fire Hazard	Yes
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act Not applicable

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Hexane	X		-

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Hexane	5000 lb	-

California Proposition 65 This product does not contain any Proposition 65 chemicals.

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Hexane	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ):	Y
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

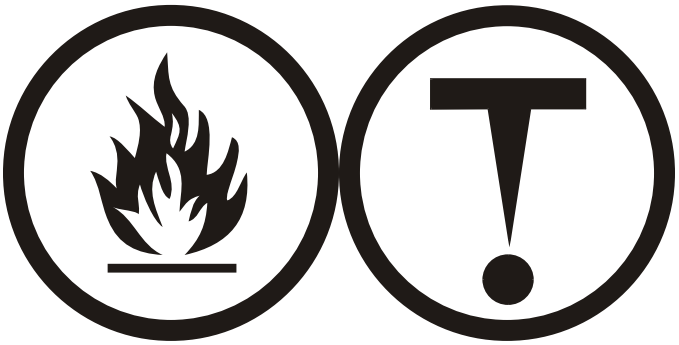
U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade Serious risk, Grade 3

Canada
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS Hazard Class B2 Flammable liquid
D2A Very toxic materials



16. Other information

Prepared By	Regulatory Affairs Thermo Fisher Scientific Email: EMSDS.RA@thermofisher.com
Creation Date	26-Oct-2009
Revision Date	02-Apr-2014
Print Date	02-Apr-2014
Revision Summary	This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer

The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS

SAFETY DATA SHEET

Creation Date 04-Oct-2010 **Revision Date** 10-Feb-2015 **Revision Number** 1

1. Identification

Product Name **Nickel, powder**

Cat No. : **AC193610000; AC193610250; AC193611000; AC193615000**

Synonyms Raney alloy

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Entity / Business Name
Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Skin Sensitization	Category 1
Carcinogenicity	Category 2
Specific target organ toxicity - (repeated exposure)	Category 1
Target Organs - Kidney, Blood.	

Label Elements

Signal Word
Danger

Hazard Statements
May cause an allergic skin reaction
Causes damage to organs through prolonged or repeated exposure
Suspected of causing cancer

Precautionary Statements

Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Wear protective gloves/protective clothing/eye protection/face protection
Do not breathe dust/fume/gas/mist/vapors/spray
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Contaminated work clothing should not be allowed out of the workplace
Response
IF exposed or concerned: Get medical attention/advice
Skin
IF ON SKIN: Wash with plenty of soap and water
If skin irritation or rash occurs: Get medical advice/attention
Wash contaminated clothing before reuse
Storage
Store locked up
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Harmful to aquatic life with long lasting effects

3. Composition / information on ingredients

Component	CAS-No	Weight %
Nickel powder	7440-02-0	>95

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Immediate medical attention is required.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.

Inhalation Move to fresh air. If breathing is difficult, give oxygen. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with a respiratory medical device. Immediate medical attention is required.

Ingestion Do not induce vomiting. Call a physician or Poison Control Center immediately.

Most important symptoms/effects May cause allergic skin reaction. Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature 400 °C / 752 °F
Explosion Limits
Upper No data available
Lower No data available

Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Combustible material.

Hazardous Combustion Products
Nickel oxides.
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health	Flammability	Instability	Physical hazards
3	1	0	N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment. Keep people away from and upwind of spill/leak. Evacuate personnel to safe areas. Avoid dust formation.

Environmental Precautions Should not be released into the environment. See Section 12 for additional ecological information. Avoid release to the environment. Collect spillage.

Methods for Containment and Clean Up Sweep up or vacuum up spillage and collect in suitable container for disposal. Avoid dust formation.

7. Handling and storage

Handling Use only under a chemical fume hood. Wear personal protective equipment. Do not get in eyes, on skin, or on clothing. Avoid dust formation. Do not breathe vapors/dust. Do not ingest.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH
Nickel powder	TWA: 1.5 mg/m³	(Vacated) TWA: 1 mg/m³ TWA: 1 mg/m³	IDLH: 10 mg/m³ TWA: 0.015 mg/m³

Component	Quebec	Mexico OEL (TWA)	Ontario TWAEV
Nickel powder	TWA: 1 mg/m³	TWA: 1 mg/m³	TWA: 1 mg/m³

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health

Engineering Measures Use only under a chemical fume hood. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Solid
Appearance	Brown
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	1455 °C / 2651 °F
Boiling Point/Range	2730 °C / 4946 °F
Flash Point	No information available
Evaporation Rate	No information available
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	1 mmHg @ 1810 °C
Vapor Density	No information available
Relative Density	No information available
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	400 °C / 752 °F
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	Ni
Molecular Weight	58.7

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products. Excess heat. Avoid dust formation.

Incompatible Materials Strong oxidizing agents

Hazardous Decomposition Products Nickel oxides

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Nickel powder	9000 mg/kg (Rat)	Not listed	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization May cause sensitization by skin contact Nickel and nickel compounds may cause a form of dermatitis known as nickel itch. May cause an allergic skin reaction

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Nickel powder	7440-02-0	Group 2B	Reasonably Anticipated	Not listed	X	Not listed

IARC: (International Agency for Research on Cancer) *Group 2B - Possibly Carcinogenic to Humans*

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known
STOT - repeated exposure Kidney Blood

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing
Endocrine Disruptor Information No information available

Other Adverse Effects See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity
Do not flush into surface water or sanitary sewer system. Do not allow material to contaminate ground water system. Do not empty into drains. Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Nickel powder	0.18 mg/L EC50 = 72 h 0.174 - 0.311 mg/L EC50 96 h	10.4 mg/L LC50 96 h 1.3 mg/L LC50 96 h 100 mg/L LC50 96 h	Not listed	1 mg/L EC50 = 48 h 100 mg/L EC50 > 48 h

Persistence and Degradability No information available
Bioaccumulation/ Accumulation No information available.

Mobility No information available.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT
- **UN-No** UN3089
- **Proper Shipping Name** METAL POWDERS, FLAMMABLE, N.O.S.
- **Hazard Class** 4.1
- **Packing Group** II

TDG
- **UN-No** UN3089
- **Proper Shipping Name** METAL POWDERS, FLAMMABLE, N.O.S.
- **Hazard Class** 4.1
- **Packing Group** II

IATA

UN-No	3089
Proper Shipping Name	METAL POWDERS, FLAMMABLE, N.O.S.
Hazard Class	4.1
Packing Group	II

IMDG/IMO

UN-No	3089
Proper Shipping Name	METAL POWDERS, FLAMMABLE, N.O.S.
Hazard Class	4.1
Packing Group	II

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Nickel powder	X	X	-	231-111-4	-		X	-	X	X	X

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Nickel powder	7440-02-0	>95	0.1

SARA 311/312 Hazardous Categorization

Acute Health Hazard	Yes
Chronic Health Hazard	Yes
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Nickel powder	-	-	X	X

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Nickel powder	X		-

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive

Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Nickel powder	100 lb	-

California Proposition 65 This product contains the following Proposition 65 chemicals:

Component	CAS-No	California Prop. 65	Prop 65 NSRL	Category
Nickel powder	7440-02-0	Carcinogen	-	Carcinogen

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Nickel powder	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class D2A Very toxic materials

16. Other information

Prepared By Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 04-Oct-2010
Revision Date 10-Feb-2015
Print Date 10-Feb-2015
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer
The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS

SAFETY DATA SHEET

Version 5.6
Revision Date 05/24/2016
Print Date 11/14/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : *N*-Nitrosodimethylamine

Product Number : N7756
Brand : Sigma
Index-No. : 612-077-00-3

CAS-No. : 62-75-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 4), H227
Acute toxicity, Oral (Category 2), H300
Acute toxicity, Inhalation (Category 1), H330
Carcinogenicity (Category 1B), H350
Specific target organ toxicity - repeated exposure (Category 1), H372
Acute aquatic toxicity (Category 2), H401
Chronic aquatic toxicity (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H227	Combustible liquid.
H300 + H330	Fatal if swallowed or if inhaled
H350	May cause cancer.
H372	Causes damage to organs through prolonged or repeated exposure.
H411	Toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P210	Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P284	Wear respiratory protection.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER/doctor. Rinse mouth.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/doctor.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	Dimethylnitrosamine
Formula	:	$C_2H_6N_2O$
Molecular weight	:	74.08 g/mol
CAS-No.	:	62-75-9
EC-No.	:	200-549-8
Index-No.	:	612-077-00-3

Hazardous components

Component	Classification	Concentration
N-Nitrosodimethylamine		
	Flam. Liq. 4; Acute Tox. 2; Acute Tox. 1; Carc. 1B; STOT RE 1; Aquatic Acute 2; Aquatic Chronic 2; H227, H300 + H330, H350, H372, H411	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Recommended storage temperature 2 - 8 °C

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

	Remarks	Potential Occupational Carcinogen See Appendix A
		Liver damage Liver cancer Kidney cancer Exposure by all routes should be carefully controlled to levels as low as possible. Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption
		See 1910.1016

Hazardous components without workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Colour: yellow
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	153 °C (307 °F) at 1,032 hPa (774 mmHg) - lit.
g)	Flash point	61.0 °C (141.8 °F) - closed cup

h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	1.01 g/cm3
n)	Water solubility	soluble
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Nitrogen oxides (NOx)
Hazardous decomposition products formed under fire conditions. - Nature of decomposition products not known.
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Nitrogen oxides (NOx)
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 37.0 mg/kg

LC50 Inhalation - Rat - 4 h - 78 ppm

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
Laboratory experiments have shown mutagenic effects.

Carcinogenicity

This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Possible human carcinogen

IARC:	2A - Group 2A: Probably carcinogenic to humans (N-Nitrosodimethylamine)
NTP:	Reasonably anticipated to be a human carcinogen (N-Nitrosodimethylamine)
OSHA:	OSHA specifically regulated carcinogen (N-Nitrosodimethylamine)

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard
No data available

Additional Information
RTECS: IQ0525000

Bladder -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - 832.00 - 1,062.00 mg/l - 96 h
Toxicity to algae	EC50 - Pseudokirchneriella subcapitata (green algae) - 4.00 mg/l - 96 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3382 Class: 6.1 Packing group: I
Proper shipping name: Toxic by inhalation liquid, n.o.s. (N-Nitrosodimethylamine)
Reportable Quantity (RQ): 10 lbs

Poison Inhalation Hazard: Hazard zone B

IMDG
UN number: 3382 Class: 6.1 Packing group: I EMS-No: F-A, S-A
Proper shipping name: TOXIC BY INHALATION LIQUID, N.O.S. (N-Nitrosodimethylamine)
Marine pollutant:yes

IATA
UN number: 3382 Class: 6.1
Proper shipping name: Toxic by inhalation liquid, n.o.s. (N-Nitrosodimethylamine)
IATA Passenger: Not permitted for transport
IATA Cargo: Not permitted for transport

15. REGULATORY INFORMATION

SARA 302 Components
The following components are subject to reporting levels established by SARA Title III, Section 302:

	CAS-No.	Revision Date
N-Nitrosodimethylamine	62-75-9	2008-11-03

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
N-Nitrosodimethylamine	62-75-9	2008-11-03

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
N-Nitrosodimethylamine	62-75-9	2008-11-03

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
N-Nitrosodimethylamine	62-75-9	2008-11-03

New Jersey Right To Know Components

	CAS-No.	Revision Date
N-Nitrosodimethylamine	62-75-9	2008-11-03

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No.	Revision Date
N-Nitrosodimethylamine	62-75-9	2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
Flam. Liq.	Flammable liquids
H227	Combustible liquid.
H300	Fatal if swallowed.
H300 + H330	Fatal if swallowed or if inhaled
H330	Fatal if inhaled.
H350	May cause cancer.

HMIS Rating

Health hazard:	3
Chronic Health Hazard:	*
Flammability:	2
Physical Hazard	0

NFPA Rating

Health hazard:	4
Fire Hazard:	2
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.6 Revision Date: 05/24/2016 Print Date: 11/14/2016

SAFETY DATA SHEET

Version 6.8
Revision Date 09/06/2024
Print Date 09/06/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Propylbenzene

Product Number : P52407
Brand : Aldrich
Index-No. : 601-024-00-X
CAS-No. : 103-65-1

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquids (Category 3), H226
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Aspiration hazard (Category 1), H304

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Short-term (acute) aquatic hazard (Category 2), H401
Long-term (chronic) aquatic hazard (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal Word Danger

Hazard Statements

H226	Flammable liquid and vapor.
H304	May be fatal if swallowed and enters airways.
H335	May cause respiratory irritation.
H411	Toxic to aquatic life with long lasting effects.

Precautionary Statements

P210	Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P261	Avoid breathing mist or vapors.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ eye protection/ face protection.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER/ doctor.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor if you feel unwell.
P331	Do NOT induce vomiting.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms : 1-Phenylpropane

Formula : C_9H_{12}

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Molecular weight	:	120.19 g/mol
CAS-No.	:	103-65-1
EC-No.	:	203-132-9
Index-No.	:	601-024-00-X

Component	Classification	Concentration
propylbenzene		
	Flam. Liq. 3; STOT SE 3; Asp. Tox. 1; Aquatic Acute 2; Aquatic Chronic 2; H226, H335, H304, H401, H411	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

In case of eye contact
After eye contact: rinse out with plenty of water. Remove contact lenses.

If swallowed
After swallowing: caution if victim vomits. Risk of aspiration! Keep airways free. Pulmonary failure possible after aspiration of vomit. Call a physician immediately.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Carbon dioxide (CO2) Foam Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

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5.2 Special hazards arising from the substance or mixture

Carbon oxides
Combustible.
Vapors are heavier than air and may spread along floors.
Forms explosive mixtures with air at elevated temperatures.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters

In the event of fire, wear self-contained breathing apparatus.

5.4 Further information

Remove container from danger zone and cool with water. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition.
Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains. Risk of explosion.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on protection against fire and explosion
Keep away from open flames, hot surfaces and sources of ignition.Take precautionary measures against static discharge.

Hygiene measures
Change contaminated clothing. Wash hands after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Keep container tightly closed in a dry and well-ventilated place. Keep away from heat and sources of ignition.

Storage class
Storage class (TRGS 510): 3: Flammable liquids

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7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls

Change contaminated clothing. Wash hands after working with substance.

Personal protective equipment

Eye/face protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Full contact
Material: Viton®
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 10 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

Body Protection

Flame retardant antistatic protective clothing.

Respiratory protection

Recommended Filter type: Filter A (acc. to DIN 3181) for vapours of organic compounds
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.

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required when vapours/aerosols are generated. Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains. Risk of explosion.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid, clear Color: colorless
b)	Odor	No data available
c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/ range: -99 °C (-146 °F) - lit.
f)	Initial boiling point and boiling range	159 °C 318 °F - lit.
g)	Flash point	42.0 °C (107.6 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 6 %(V) Lower explosion limit: 0.8 %(V)
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Density	0.862 g/cm3 at 25 °C (77 °F) - lit.
	Relative density	No data available
n)	Water solubility	slightly soluble
o)	Partition coefficient: n-octanol/water	No data available
p)	Autoignition temperature	450.0 °C (842.0 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	none

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9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
Vapor/air-mixtures are explosive at intense warming.

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
Risk of ignition or formation of inflammable gases or vapours with:
Strong oxidizing agents

10.4 Conditions to avoid
Heating.

10.5 Incompatible materials
rubber

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 6,040 mg/kg
Remarks: Behavioral:Somnolence (general depressed activity).
LC50 Inhalation - Rat - 2 h - 65000 ppm

Dermal: No data available
No data available

Skin corrosion/irritation
Remarks: No data available

Serious eye damage/eye irritation
Remarks: No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

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NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
May cause respiratory irritation.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
May be fatal if swallowed and enters airways.

11.2 Additional Information

RTECS: DA8750000
Damage to the lungs., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Kidney -

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 1.55 mg/l - 96.0 h
Toxicity to daphnia and other aquatic invertebrates	Immobilization EC50 - Daphnia magna (Water flea) - 2 mg/l - 24 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties
No data available

12.7 Other adverse effects
Avoid release to the environment.

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SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)
UN number: 2364 Class: 3 Packing group: III
Proper shipping name: n-Propyl benzene
Reportable Quantity (RQ):
Poison Inhalation Hazard: No

IMDG
UN number: 2364 Class: 3 Packing group: III EMS-No: F-E, S-D
Proper shipping name: n-PROPYLBENZENE
Marine pollutant : yes

IATA
UN number: 2364 Class: 3 Packing group: III
Proper shipping name: n-Propylbenzene

SECTION 15: Regulatory information

CERCLA Reportable Quantity
This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity
This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity
This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards	:	Fire Hazard Acute Health Hazard
SARA 313	:	This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

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US State Regulations

Massachusetts Right To Know

propylbenzene	103-65-1

Pennsylvania Right To Know

propylbenzene	103-65-1

Maine Chemicals of High Concern

Product does not contain any listed chemicals

Vermont Chemicals of High Concern

Product does not contain any listed chemicals

Washington Chemicals of High Concern

Product does not contain any listed chemicals

The ingredients of this product are reported in the following inventories:

TSCA : All substances listed as active on the TSCA inventory

TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 6.8 Revision Date: 09/06/2024 Print Date: 09/06/2024

The life science business of Merck KGaA, Darmstadt, Germany
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SAFETY DATA SHEET

Version 5.5
Revision Date 06/02/2016
Print Date 06/21/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : *o*-Xylene

Product Number : 95660
Brand : Sigma-Aldrich
Index-No. : 601-022-00-9

CAS-No. : 95-47-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 3), H226
Acute toxicity, Inhalation (Category 4), H332
Acute toxicity, Dermal (Category 4), H312
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Aspiration hazard (Category 1), H304
Acute aquatic toxicity (Category 3), H402
Chronic aquatic toxicity (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H226	Flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H312 + H332	Harmful in contact with skin or if inhaled
H315	Causes skin irritation.
H319	Causes serious eye irritation.

H335	May cause respiratory irritation.
H412	Harmful to aquatic life with long lasting effects.

Precautionary statement(s)

P210	Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER/doctor.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P331	Do NOT induce vomiting.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	1,2-Dimethylbenzene
Formula	:	C_8H_{10}
Molecular weight	:	106.17 g/mol
CAS-No.	:	95-47-6
EC-No.	:	202-422-2
Index-No.	:	601-022-00-9

Hazardous components

Component	Classification	Concentration
o-Xylene		
	Flam. Liq. 3; Acute Tox. 4; Skin Irrit. 2; Eye Irrit. 2A; STOT SE 3; Asp. Tox. 1; Aquatic Acute 3; Aquatic Chronic 3; H226, H304, H312 + H332, H315, H319, H335, H412	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): Flammable liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
o-Xylene	95-47-6	TWA	100.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Eye & Upper Respiratory Tract irritation Central Nervous System impairment Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		STEL	150.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Eye & Upper Respiratory Tract irritation Central Nervous System impairment Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		TWA	100.000000 ppm 435.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	100.000000 ppm 435.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	150.000000 ppm 655.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	100.000000 ppm 435.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		
		TWA	100.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		STEL	150.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment		

		Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		TWA	100 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		STEL	150 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		TWA	100 ppm 435 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
o-Xylene	95-47-6	Methylhippuric acids	1,500.0000 mg/g	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift (As soon as possible after exposure ceases)			
		Methylhippuric acids	1.5g/g creatinine	Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift (As soon as possible after exposure ceases)			

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: Nitrile rubber

Minimum layer thickness: 0.4 mm
Break through time: 30 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -26 - -23 °C (-15 - -9 °F) - lit.
f)	Initial boiling point and boiling range	143 - 145 °C (289 - 293 °F) - lit.
g)	Flash point	31.0 °C (87.8 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 6.7 %(V) Lower explosion limit: 0.9 %(V)
k)	Vapour pressure	21.3 hPa (16.0 mmHg) at 37.7 °C (99.9 °F)
l)	Vapour density	No data available
m)	Relative density	0.879 g/mL at 20 °C (68 °F)
n)	Water solubility	0.1705 g/l at 25 °C (77 °F) - partly soluble
o)	Partition coefficient: n-octanol/water	log Pow: 3.12 at 20 °C (68 °F)
p)	Auto-ignition temperature	464.0 °C (867.2 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available

s) Explosive properties No data available

t) Oxidizing properties No data available

9.2 Other safety information

Surface tension 29.8 mN/m at 25.0 °C (77.0 °F)

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Vapours may form explosive mixture with air.

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available

LC50 Inhalation - Rat - male - 6 h - 18,800 mg/m3

Dermal: No data available

LD50 Intraperitoneal - Mouse - 1,364 mg/kg

Skin corrosion/irritation
Skin - Rabbit
Result: Irritating to skin. - 24 h

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
- Mouse
Result: Does not cause skin sensitisation.
(OECD Test Guideline 429)

Germ cell mutagenicity
Ames test
Salmonella typhimurium
Result: negative

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (o-Xylene)

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
May be fatal if swallowed and enters airways.

Additional Information
RTECS: ZE2450000

narcosis, Lung irritation, chest pain, pulmonary edema, Central nervous system depression, Dermatitis, Gastrointestinal disturbance, Liver injury may occur., Kidney injury may occur., Blood disorders

Nerves. -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Lepomis macrochirus (Bluegill) - 16.10 mg/l - 96 h

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 28 d Result: 69.67 % - Not readily biodegradable. (OECD Test Guideline 301F) Remarks: The 10 day time window criterion is not fulfilled.

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Harmful to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Contact a licensed professional waste disposal service to dispose of this material. Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1307 Class: 3 Packing group: III
Proper shipping name: Xylenes
Reportable Quantity (RQ): 100 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 1307 Class: 3 Packing group: III EMS-No: F-E, S-D
Proper shipping name: XYLENES

IATA
UN number: 1307 Class: 3 Packing group: III
Proper shipping name: Xylenes

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
o-Xylene	95-47-6	2007-07-01

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
o-Xylene	95-47-6	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
o-Xylene	95-47-6	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
o-Xylene	95-47-6	2007-07-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Asp. Tox.	Aspiration hazard
Eye Irrit.	Eye irritation
Flam. Liq.	Flammable liquids
H226	Flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H312	Harmful in contact with skin.

H312 + H332	Harmful in contact with skin or if inhaled
H315	Causes skin irritation.
H319	Causes serious eye irritation.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	
Flammability:	3
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	3
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.5 Revision Date: 06/02/2016 Print Date: 06/21/2016

SAFETY DATA SHEET

Version 4.5
Revision Date 07/08/2014
Print Date 10/12/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : 4-Ethyltoluene

Product Number : E49800
Brand : Aldrich

CAS-No. : 622-96-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 3), H226
Aspiration hazard (Category 1), H304

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H226 Flammable liquid and vapour.
H304 May be fatal if swallowed and enters airways.

Precautionary statement(s)
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P233 Keep container tightly closed.
P240 Ground/bond container and receiving equipment.
P241 Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242 Use only non-sparking tools.
P243 Take precautionary measures against static discharge.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.

P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P331	Do NOT induce vomiting.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula : C_9H_{12}
Molecular Weight : 120.19 g/mol
CAS-No. : 622-96-8
EC-No. : 210-761-2

Hazardous components

Component	Classification	Concentration
4-Ethyltoluene		
	Flam. Liq. 3; Asp. Tox. 1; H226, H304	-

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
no data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

5.2 Special hazards arising from the substance or mixture
Carbon oxides

5.3 Advice for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm

Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: clear, liquid Colour: light yellow
b)	Odour	no data available
c)	Odour Threshold	no data available
d)	pH	no data available
e)	Melting point/freezing point	no data available
f)	Initial boiling point and boiling range	162 °C (324 °F) - lit.
g)	Flash point	43 °C (109 °F) - closed cup
h)	Evapouration rate	no data available
i)	Flammability (solid, gas)	no data available
j)	Upper/lower flammability or explosive limits	no data available
k)	Vapour pressure	no data available
l)	Vapour density	no data available
m)	Relative density	0.861 g/cm3 at 25 °C (77 °F)
n)	Water solubility	no data available
o)	Partition coefficient: n-octanol/water	no data available
p)	Auto-ignition temperature	no data available
q)	Decomposition temperature	no data available
r)	Viscosity	no data available
s)	Explosive properties	no data available

t) Oxidizing properties no data available

9.2 Other safety information
no data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
no data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
no data available

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - no data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - rat - 4,850 mg/kg
Remarks: Behavioral:Convulsions or effect on seizure threshold. Behavioral:Ataxia.

Inhalation: no data available

Dermal: no data available

no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitisation
no data available

Germ cell mutagenicity

mouse
Sister chromatid exchange

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
no data available

Reproductive toxicity - rat - Oral
Maternal Effects: Other effects. Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

no data available

Specific target organ toxicity - single exposure
no data available

Specific target organ toxicity - repeated exposure
no data available

Aspiration hazard
The substance or mixture is known to cause human aspiration toxicity hazards or has to be regarded as if it causes a human aspiration toxicity hazard.

Additional Information
RTECS: XT2550000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity
no data available

12.2 Persistence and degradability
no data available

12.3 Bioaccumulative potential
no data available

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

no data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3295 Class: 3 Packing group: III
Proper shipping name: Hydrocarbons, liquid, n.o.s.
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN number: 3295 Class: 3 Packing group: III EMS-No: F-E, S-D
Proper shipping name: HYDROCARBONS, LIQUID, N.O.S.
Marine pollutant: No

IATA

UN number: 3295 Class: 3 Packing group: III
Proper shipping name: Hydrocarbons, liquid, n.o.s.

15. REGULATORY INFORMATION

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Fire Hazard

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
4-Ethyltoluene	622-96-8	

New Jersey Right To Know Components

	CAS-No.	Revision Date
4-Ethyltoluene	622-96-8	

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Asp. Tox.	Aspiration hazard
Flam. Liq.	Flammable liquids
H226	Flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.

HMIS Rating

Health hazard:	1
Chronic Health Hazard:	
Flammability:	2
Physical Hazard	0

NFPA Rating

Health hazard:	0
Fire Hazard:	2
Reactivity Hazard:	0

Further information
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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information
Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

SAFETY DATA SHEET

Version 6.4
Revision Date 04/18/2021
Print Date 06/19/2021

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Perfluorooctanoic acid

Product Number : 171468
Brand : Aldrich
CAS-No. : 335-67-1

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 4), H302
Skin corrosion (Category 1B), H314
Serious eye damage (Category 1), H318
Carcinogenicity (Category 2), H351
Reproductive toxicity (Category 1B), H360
Effects on or via lactation, H362
Specific target organ toxicity - repeated exposure (Category 1), Liver, H372

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

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Signal word	Danger
Hazard statement(s)	
H302	Harmful if swallowed.
H314	Causes severe skin burns and eye damage.
H351	Suspected of causing cancer.
H360	May damage fertility or the unborn child.
H362	May cause harm to breast-fed children.
H372	Causes damage to organs (Liver) through prolonged or repeated exposure.
Precautionary statement(s)	
P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust/ fume/ gas/ mist/ vapors/ spray.
P263	Avoid contact during pregnancy/ while nursing.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell. Rinse mouth.
P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/ doctor.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P363	Wash contaminated clothing before reuse.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Pentadecafluorooctanoic acid Perfluorocaprylic acid Perfluorooctanoic acid
Formula	:	$C_8HF_{15}O_2$
Molecular weight	:	414.07 g/mol
CAS-No.	:	335-67-1
EC-No.	:	206-397-9

Component	Classification	Concentration
pentadecafluorooctanoic acid		
	Acute Tox. 4; Skin Corr.	<= 100 %

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	1B; Eye Dam. 1; Carc. 2; Repr. 1B; Lact. ; STOT RE 1; H302, H314, H318, H351, H360, H362, H372	

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
First aiders need to protect themselves. Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Call in physician.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Call a physician immediately.

In case of eye contact
After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist. Remove contact lenses.

If swallowed
After swallowing: make victim drink water (two glasses at most), avoid vomiting (risk of perforation). Call a physician immediately. Do not attempt to neutralise.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Water Foam Carbon dioxide (CO2) Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

Carbon oxides
Hydrogen fluoride
Combustible.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

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5.4 Further information

Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Avoid generation and inhalation of dusts in all circumstances. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully. Dispose of properly. Clean up affected area. Avoid generation of dusts.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Work under hood. Do not inhale substance/mixture.

Hygiene measures
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Dry. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.
Storage class (TRGS 510): 6.1C: Combustible, acute toxic Cat.3 / toxic compounds or compounds which causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters
Contains no substances with occupational exposure limit values.

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8.2 Exposure controls

Appropriate engineering controls
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Tightly fitting safety goggles

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: > 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: > 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the EC approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Acid-resistant protective clothing

Respiratory protection
required when dusts are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: flakes Color: colorless

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b)	Odor	stinging
c)	Odor Threshold	No data available
d)	pH	2.6 at 1 g/l at 20 °C (68 °F)
e)	Melting point/freezing point	Melting point/range: 55 - 56 °C (131 - 133 °F) - lit.
f)	Initial boiling point and boiling range	189 °C 372 °F at 981 hPa - lit.
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	0.69 hPa at 25 °C (77 °F)
l)	Vapor density	No data available
m)	Relative density	No data available
n)	Water solubility	3.4 g/l at 20 °C (68 °F)
o)	Partition coefficient: n-octanol/water	log Pow: 6.30 - Potential bioaccumulation, (Lit.)
p)	Autoignition temperature	No data available
q)	Decomposition temperature	> 300 °C (> 572 °F) -
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

The following applies in general to flammable organic substances and mixtures: in correspondingly fine distribution, when whirled up a dust explosion potential may generally be assumed.

10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions

Violent reactions possible with:
Strong oxidizing agents
Strong acids
Bases

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10.4 Conditions to avoid
no information available

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
Acute toxicity estimate Oral - 500.1 mg/kg
(Expert judgment)

Acute toxicity estimate Inhalation - 4 h - 11.1 mg/l
(Expert judgment)

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
Causes serious eye damage.

Respiratory or skin sensitization

Germ cell mutagenicity
No data available

No data available
No data available

Carcinogenicity
Suspected of causing cancer.

IARC: 2B - Group 2B: Possibly carcinogenic to humans (pentadecafluorooctanoic acid)

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
May damage the unborn child.
Studies indicating a hazard to babies during the lactation period

Specific target organ toxicity - single exposure

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Specific target organ toxicity - repeated exposure
Causes damage to organs through prolonged or repeated exposure. - Liver

Aspiration hazard

11.2 Additional Information

RTECS: RH0781000

Cough, Shortness of breath, Headache, Nausea, Vomiting
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

After absorption:

gastric pain
Nausea
Vomiting
Drowsiness
somnolence

Handle in accordance with good industrial hygiene and safety practice.

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

No data available

Toxicity to daphnia and other aquatic invertebrates	Remarks: No data available (pentadecafluorooctanoic acid)
Toxicity to algae	Remarks: No data available (pentadecafluorooctanoic acid)

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

Discharge into the environment must be avoided.

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SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself. See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14: Transport information

DOT (US)
UN number: 3261 Class: 8 Packing group: III
Proper shipping name: Corrosive solid, acidic, organic, n.o.s. (pentadecafluorooctanoic acid)
Reportable Quantity (RQ):
Poison Inhalation Hazard: No

IMDG
UN number: 3261 Class: 8 Packing group: III EMS-No: F-A, S-B
Proper shipping name: CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S. (pentadecafluorooctanoic acid)

IATA
UN number: 3261 Class: 8 Packing group: III
Proper shipping name: Corrosive solid, acidic, organic, n.o.s. (pentadecafluorooctanoic acid)

SECTION 15: Regulatory information

SARA 302 Components
This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
pentadecafluorooctanoic acid	335-67-1	2018-02-01

New Jersey Right To Know Components

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SECTION 16: Other information

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.4 Revision Date: 04/18/2021 Print Date: 06/19/2021

The life science business of Merck KGaA, Darmstadt, Germany
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SAFETY DATA SHEET

Version 4.2
Revision Date 09/08/2015
Print Date 10/19/2018

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Nonafluorobutane-1-sulfonic acid

Product Number : 562629
Brand : Aldrich

CAS-No. : 375-73-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 4), H302
Skin corrosion (Category 1B), H314
Serious eye damage (Category 1), H318

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H302 Harmful if swallowed.
H314 Causes severe skin burns and eye damage.

Precautionary statement(s)
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P312 IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell.
P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353 IF ON SKIN (or hair): Remove/ Take off immediately all contaminated

	clothing. Rinse skin with water/ shower.
P304 + P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTER or doctor/ physician.
P321	Specific treatment (see supplemental first aid instructions on this label).
P363	Wash contaminated clothing before reuse.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS
Reacts violently with water.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	$C_4HF_9O_3S$
Molecular weight	:	300.10 g/mol
CAS-No.	:	375-73-5
EC-No.	:	206-793-1

Hazardous components

Component	Classification	Concentration
1,1,2,2,3,3,4,4,4-Nonafluorobutane-1-sulphonic acid		
	Acute Tox. 4; Skin Corr. 1B; Eye Dam. 1; H302, H314	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.Continue rinsing eyes during transport to hospital.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Dry powder

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Sulphur oxides, Hydrogen fluoride

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Do not flush with water. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Never allow product to get in contact with water during storage.

Recommended storage temperature 2 - 8 °C

Handle and store under inert gas.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection
Complete suit protecting against chemicals, Flame retardant protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	112 - 114 °C (234 - 237 °F) at 19 hPa (14 mmHg) - lit.
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	1.811 g/cm3 at 25 °C (77 °F)
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Reacts violently with water.

10.4 Conditions to avoid
Do not allow water to enter container because of violent reaction.
Exposure to moisture

10.5 Incompatible materials
Strong oxidizing agentsStrong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 430 mg/kg
Remarks: Behavioral:Somnolence (general depressed activity). Skin and Appendages: Other: Hair. Nutritional and Gross Metabolic:Weight loss or decreased weight gain.

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: EK5930000

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3265 Class: 8 Packing group: II
Proper shipping name: Corrosive liquid, acidic, organic, n.o.s. (1,1,2,2,3,3,4,4,4-Nonafluorobutane-1-sulphonic acid)

Poison Inhalation Hazard: No

IMDG
UN number: 3265 Class: 8 Packing group: II EMS-No: F-A, S-B
Proper shipping name: CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (1,1,2,2,3,3,4,4,4-Nonafluorobutane-1-sulphonic acid)

IATA
UN number: 3265 Class: 8 Packing group: II
Proper shipping name: Corrosive liquid, acidic, organic, n.o.s. (1,1,2,2,3,3,4,4,4-Nonafluorobutane-1-sulphonic acid)

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Acute Health Hazard

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

CAS-No. Revision Date

1,1,2,2,3,3,4,4,4-Nonafluorobutane-1-sulphonic acid	375-73-5

New Jersey Right To Know Components

	CAS-No.	Revision Date
1,1,2,2,3,3,4,4,4-Nonafluorobutane-1-sulphonic acid	375-73-5	

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Eye Dam.	Serious eye damage
H302	Harmful if swallowed.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
Skin Corr.	Skin corrosion

HMIS Rating

Health hazard:	3
Chronic Health Hazard:	
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	3
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.2 Revision Date: 09/08/2015 Print Date: 10/19/2018

SAFETY DATA SHEET

Version 6.2
Revision Date 09/18/2019
Print Date 06/19/2021

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Perfluorodecanoic acid

Product Number : 177741
Brand : Aldrich
CAS-No. : 335-76-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 3), H301
Carcinogenicity (Category 2), H351
Reproductive toxicity (Category 1B), H360
Effects on or via lactation, H362

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

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Hazard statement(s)

H301	Toxic if swallowed.
H351	Suspected of causing cancer.
H360	May damage fertility or the unborn child.
H362	May cause harm to breast-fed children.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust or mist.
P263	Avoid contact during pregnancy/ while nursing.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER/doctor. Rinse mouth.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Nonadecafluorodecanoic acid Nonadecafluorocapric acid Perfluorodecanoic acid Perfluorocapric acid
Formula	:	$C_{10}HF_{19}O_2$
Molecular weight	:	514.08 g/mol
CAS-No.	:	335-76-2
EC-No.	:	206-400-3

Component	Classification	Concentration
Nonadecafluorodecanoic acid		
	Acute Tox. 3; Carc. 2; Repr. 1B; Lact. ; H301, H351, H360, H362	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

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SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Hydrogen fluoride

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust. For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

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6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Keep in a dry place.
Storage class (TRGS 510): 6.1C: Combustible, acute toxic Cat.3 / toxic compounds or compounds which causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min

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Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder Colour: white
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 77 - 81 °C (171 - 178 °F) - lit.
f)	Initial boiling point and boiling range	218 °C 424 °F at 987 hPa - lit.
g)	Flash point	()No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available

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k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Bases, Strong oxidizing agents, Reducing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen fluoride
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 57 mg/kg
Remarks: Behavioral:Food intake (animal).
Dermal: No data available
No data available

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Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity

Rat
DNA damage

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: HD9900000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

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12.6 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

SECTION 14: Transport information

DOT (US)

UN number: 2811 Class: 6.1 Packing group: III
Proper shipping name: Toxic solids, organic, n.o.s. (Nonadecafluorodecanoic acid)
Reportable Quantity (RQ):
Poison Inhalation Hazard: No

IMDG

UN number: 2811 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. (Nonadecafluorodecanoic acid)

IATA

UN number: 2811 Class: 6.1 Packing group: III
Proper shipping name: Toxic solid, organic, n.o.s. (Nonadecafluorodecanoic acid)

SECTION 15: Regulatory information

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Acute Health Hazard

Massachusetts Right To Know Components

No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

Nonadecafluorodecanoic acid	CAS-No. 335-76-2	Revision Date

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SECTION 16: Other information

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.2 Revision Date: 09/18/2019 Print Date: 06/19/2021

The life science business of Merck KGaA, Darmstadt, Germany
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SAFETY DATA SHEET

Version 6.3
Revision Date 04/18/2021
Print Date 07/08/2021

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Tricosafluorododecanoic acid

Product Number : 406449
Brand : Aldrich
CAS-No. : 307-55-1

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Short-term (acute) aquatic hazard (Category 1), H400

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

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Hazard statement(s)

H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H400	Very toxic to aquatic life.

Precautionary statement(s)

P261	Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ eye protection/ face protection.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Perfluorododecanoic acid Perfluorolauric acid
Formula	:	$C_{12}HF_{23}O_2$
Molecular weight	:	614.10 g/mol
CAS-No.	:	307-55-1
EC-No.	:	206-203-2

Component	Classification	Concentration
Tricosafluorododecanoic acid		
	Acute Tox. 4; Carc. 2; Repr. 1B; Lact. ; STOT RE 1; H302, H332, H351, H360, H362, H372 M-Factor - Aquatic Acute: 10	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

The life science business of Merck KGaA, Darmstadt, Germany
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SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Consult a physician. Show this material safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides
Hydrogen fluoride

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust. For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

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operates as MilliporeSigma in the US and Canada

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols.**Advice on safe handling**

Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.

Advice on protection against fire and explosion

Provide appropriate exhaust ventilation at places where dust is formed.

Hygiene measures

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions

Keep container tightly closed in a dry and well-ventilated place.
Storage class (TRGS 510): 11: Combustible Solids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact

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with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection
Impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator.For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: crystalline Color: white
b)	Odor	No data available
c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 105 - 108 °C (221 - 226 °F) - lit.
f)	Initial boiling point and boiling range	245 °C 473 °F at 987 hPa - lit.
g)	Flash point	()No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Autoignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available

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s) Explosive properties No data available

t) Oxidizing properties No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
Acute toxicity estimate Oral - 500.1 mg/kg
(Expert judgment)

Acute toxicity estimate Inhalation - 4 h - 11.1 mg/l
(Expert judgment)

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
Causes serious eye damage.

Respiratory or skin sensitization

Germ cell mutagenicity
No data available

No data available
No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Carcinogenicity
Suspected of causing cancer.

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
May damage the unborn child.
Studies indicating a hazard to babies during the lactation period

Specific target organ toxicity - single exposure

Specific target organ toxicity - repeated exposure
Causes damage to organs through prolonged or repeated exposure. - Liver

Aspiration hazard

11.2 Additional Information
Not available

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

After absorption:

gastric pain
Nausea
Vomiting
Drowsiness
somnolence

Handle in accordance with good industrial hygiene and safety practice.

SECTION 12: Ecological information

12.1 Toxicity
No data available

Toxicity to daphnia and other aquatic invertebrates	Remarks: No data available (Tricosafluorododecanoic acid)
Toxicity to algae	Remarks: No data available (Tricosafluorododecanoic acid)

12.2 Persistence and degradability
No data available

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operates as MilliporeSigma in the US and Canada

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life.
Discharge into the environment must be avoided.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

DOT (US)
Not dangerous goods

IMDG
Not dangerous goods

IATA
Not dangerous goods

Further information
Not classified as dangerous in the meaning of transport regulations.

SECTION 15: Regulatory information

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Acute Health Hazard

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

Tricosafluorododecanoic acid	CAS-No. 307-55-1	Revision Date

Tricosafluorododecanoic acid	CAS-No. 307-55-1	Revision Date

New Jersey Right To Know Components

Tricosafluorododecanoic acid	CAS-No. 307-55-1	Revision Date

SECTION 16: Other information

Further information
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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 6.3 Revision Date: 04/18/2021 Print Date: 07/08/2021

The life science business of Merck KGaA, Darmstadt, Germany
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SAFETY DATA SHEET

Version 6.1
Revision Date 01/15/2020
Print Date 06/19/2021

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Perfluoroheptanoic acid

Product Number : 342041
Brand : Aldrich
CAS-No. : 375-85-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 4), H302
Skin corrosion (Category 1B), H314
Serious eye damage (Category 1), H318

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H302 Harmful if swallowed.

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H314	Causes severe skin burns and eye damage.

Precautionary statement(s)

P260	Do not breathe dust or mist.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P312	IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell.
P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTER/doctor.
P321	Specific treatment (see supplemental first aid instructions on this label).
P363	Wash contaminated clothing before reuse.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	$C_7HF_{13}O_2$
Molecular weight	:	364.06 g/mol
CAS-No.	:	375-85-9
EC-No.	:	206-798-9

Component	Classification	Concentration
Perfluoroheptanoic acid		
	Acute Tox. 4; Skin Corr. 1B; Eye Dam. 1; H302, H314, H318	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

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If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.Continue rinsing eyes during transport to hospital.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Hydrogen fluoride
Carbon oxides, Hydrogen fluoride

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

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SECTION 7: Handling and storage

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.Normal measures for preventive fire protection.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.
Storage class (TRGS 510): 8B: Non-combustible, corrosive hazardous materials

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Do not let product enter drains.

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SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: crystalline Colour: beige
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/freezing point: 30 °C (86 °F)
f)	Initial boiling point and boiling range	175 °C 347 °F at 989 hPa
g)	Flash point	> 113.00 °C (> 235.40 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	1.792 g/mL at 25 °C (77 °F)
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

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10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen fluoride
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen fluoride
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
No data available
Inhalation: No data available
Dermal: No data available
No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available
No data available

Specific target organ toxicity - single exposure
No data available

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Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: Not available

SECTION 12: Ecological information

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

DOT (US)
UN number: 3261 Class: 8 Packing group: II
Proper shipping name: Corrosive solid, acidic, organic, n.o.s. (Perfluoroheptanoic acid)
Poison Inhalation Hazard: No

IMDG
UN number: 3261 Class: 8 Packing group: II EMS-No: F-A, S-B

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Proper shipping name: CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S. (Perfluoroheptanoic acid)

IATA
UN number: 3261 Class: 8 Packing group: II
Proper shipping name: Corrosive solid, acidic, organic, n.o.s. (Perfluoroheptanoic acid)

SECTION 15: Regulatory information

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Acute Health Hazard

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

Perfluoroheptanoic acid	CAS-No. 375-85-9	Revision Date

New Jersey Right To Know Components

Perfluoroheptanoic acid	CAS-No. 375-85-9	Revision Date

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

SECTION 16: Other information

Further information
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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.1 Revision Date: 01/15/2020 Print Date: 06/19/2021

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SAFETY DATA SHEET

Version 6.7
Revision Date 09/28/2020
Print Date 06/19/2021

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Perfluorohexanoic acid

Product Number : 43809
Brand : Sigma-Aldrich
CAS-No. : 307-24-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Skin corrosion (Category 1B), H314
Serious eye damage (Category 1), H318

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H314 Causes severe skin burns and eye damage.

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Precautionary statement(s)	
P264	Wash skin thoroughly after handling.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/ doctor.
P363	Wash contaminated clothing before reuse.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	C6HF11O2
Molecular weight	:	314.06 g/mol
CAS-No.	:	307-24-4
EC-No.	:	206-196-6

Component	Classification	Concentration
Undecafluorohexanoic acid		
	Skin Corr. 1B; Eye Dam. 1; H314, H318	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
First aider needs to protect himself. Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Call in physician.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Call a physician immediately.

In case of eye contact
After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist. Remove contact lenses.

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If swallowed
After swallowing: make victim drink water (two glasses at most), avoid vomiting (risk of perforation). Call a physician immediately. Do not attempt to neutralise.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Hydrogen fluoride
Not combustible.
Ambient fire may liberate hazardous vapours.

5.3 Advice for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information
Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections
For disposal see section 13.

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SECTION 7: Handling and storage

7.1 Precautions for safe handling
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Tightly closed.

Recommended storage temperature 2 - 8 °C

Store under argon.
Storage class (TRGS 510): 8A: Combustible, corrosive hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Tightly fitting safety goggles

Skin protection
required

Body Protection
protective clothing

Respiratory protection
required when vapours/aerosols are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid
b)	Odor	No data available
c)	Odor Threshold	No data available

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d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 12 - 14 °C (54 - 57 °F)
f)	Initial boiling point and boiling range	157 °C 315 °F at 989.2 hPa
g)	Flash point	()No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Relative density	1.757 g/cm3 at 20 °C (68 °F)
n)	Water solubility	insoluble
o)	Partition coefficient: n-octanol/water	No data available
p)	Autoignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen fluoride

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Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
No data available
Inhalation: No data available
Dermal: No data available
No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC:	No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
NTP:	No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: Not available

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

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SECTION 12: Ecological information

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and loc No mixing with other waste. Handle uncleaned containers like the product See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14: Transport information

DOT (US)
UN number: 3265 Class: 8 Packing group: II
Proper shipping name: Corrosive liquid, acidic, organic, n.o.s. (Undecafluorohexanoic acid)
Reportable Quantity (RQ):
Poison Inhalation Hazard: No

IMDG
UN number: 3265 Class: 8 Packing group: II EMS-No: F-A, S-B
Proper shipping name: CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (Undecafluorohexanoic acid)

IATA
UN number: 3265 Class: 8 Packing group: II
Proper shipping name: Corrosive liquid, acidic, organic, n.o.s. (Undecafluorohexanoic acid)

SECTION 15: Regulatory information

SARA 302 Components
This material does not contain any components with a section 302 EHS TPQ.

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SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

SECTION 16: Other information

Further information
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.7 Revision Date: 09/28/2020 Print Date: 06/19/2021

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operates as MilliporeSigma in the US and Canada

AccuStandard, Inc.
125 Market St., New Haven, CT 06513 USA
Tel: 203-786-5290 Fax: 203-786-5287

SAFETY DATA SHEET

SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

1.1 - Product Identifiers

Catalog Name: S-78941

Description: Perfluorohexane sulfonic acid in Methanol

1.2 - Relevant Identified Uses of the Substance or Mixture

Laboratory Chemical Reference Material

1.3 - Supplier Details

Company: AccuStandard, Inc.
125 Market St.
New Haven, CT 06513 USA

Telephone Number: 203-786-5290

Fax: 203-786-5287

Email: edocs@accustandard.com

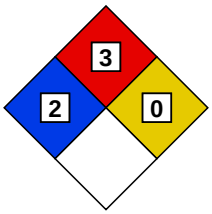
1.4 - Emergency Telephone Number

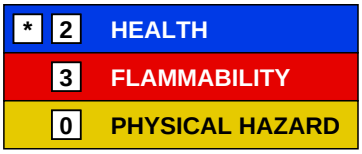
Emergency Phone #: AccuStandard, Inc.
1-203-502-7070 (USA)
+001-203-502-7070 (International)

24 hours / 7 days a week

SECTION 2 - HAZARDS IDENTIFICATION

2.1 - GHS Label Elements





Signal Word: Danger

Hazard Codes:

H225 - Highly Flammable (Flammable liquids, category 2)

H301 - Toxic if swallowed. (Acute toxicity, oral, category 3)

H311 - Toxic if absorbed through skin. (Acute toxicity, dermal, category 3)

H315 - Irritating to skin. (Skin corrosion/irritation, category 2)

H320 - Irritating to eyes. (Eye damage/irritation, category 2B)

H332 - Harmful if inhaled. (Acute toxicity, inhalation, category 4)

H336 - Overexposure may cause dizziness, nausea, muscle weakness, narcosis and respiratory failure.

H360 - California Proposition 65 Warning: This product contains a component (or components) that may cause birth defects or other reproductive harm in a quantity greater than or equal to 0.1%.

H370 - Causes damage to organs. (Specific target organ toxicity, single exposure, category 1)

Precautionary Codes:

SECTION 2 - HAZARDS IDENTIFICATION *- continued*

2.1 - GHS Label Elements *- continued*

P202 - This product should only by used by persons trained in the safe handling of hazardous chemicals.

P233 - Store in a tightly closed container. (P404)

P262 - Do not get in eyes, on skin or clothing.

P264 - Wash thoroughly after handling. Do not take internally. Eye wash and safety equipment should be readily available.

P280 - Protective gloves must be worn to prevent skin contact.

P284 - Respiratory Protection: If workplace exposure limit(s) of product or any component is exceeded (see TLV/PEL), or a risk assessment shows air-purifying respirators are appropriate, use of a NIOSH/MSHA approved air supplied respirator is advised. Use a full-face respirator with multi-purpose combination (US) or type ABEK (EN14387) respirator cartridges in absence of proper environmental control. Always use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Engineering and/or administrative controls should be implemented to reduce exposure.

P331 - Ingestion: Do NOT induce vomiting. Call a physician or poison control center immediately. Never give anything by mouth to an unconscious person.

P338 - Eye contact: Immediately flush with plenty of water. After initial flushing, remove and contact lenses and continue flushing for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers.

P360 - Skin contact: Immediately wash skin with soap and plenty of water. Remove contaminated clothing. Get medical attention if symptoms occur. Wash clothing before reuse.

2.2 - Other Hazards

2.2.1 - Symptom of Exposure Health/Environment

Highly Flammable (Flammable liquids, category 2)

Causes damage to organs. (Specific target organ toxicity, single exposure, category 1)

After ingestion or inhalation, initial symptoms may be only that of mild intoxication, but may become severe after 12 or 18 hours.

POISON: May be fatal or cause blindness if swallowed.

Overexposure may cause dizziness, nausea, muscle weakness, narcosis and respiratory failure.

2.2.2 - Potential Health Effects

Irritating to eyes. (Eye damage/irritation, category 2B)

Irritating to skin. (Skin corrosion/irritation, category 2)

Toxic if absorbed through skin. (Acute toxicity, dermal, category 3)

Irritating to mucous membrane and upper respiratory system.

Harmful if inhaled. (Acute toxicity, inhalation, category 4)

Toxic if swallowed. (Acute toxicity, oral, category 3)

2.2.3 - Routes of Entry

Inhalation, ingestion or skin contact.

2.2.4 - Carcinogenicity

California Proposition 65 Warning: This product contains a component (or components) that may cause birth defects or other reproductive harm in a quantity greater than or equal to 0.1%.

SECTION 3 - COMPOSITION / ANALYTES DATA

Description: Perfluorohexane sulfonic acid in Methanol

SECTION 3 - COMPOSITION / ANALYTES DATA *- continued*

Analyte	CAS #	% Concentration	ACGIH -TLV (mg/m^3)			OSHA -PEL (mg/m^3)		
			TWA	STEL	Skin	TWA	STEL	Skin
Perfluorohexane sulfonic acid	355-46-4	0.010						
Methanol	67-56-1	99.990				260		

SECTION 4 - FIRST AID MEASURES

4.1 - First Aid Procedures - General

Get medical assistance for all cases of overexposure.

4.2 - Eye Contact

Eye contact: Immediately flush with plenty of water. After initial flushing, remove and contact lenses and continue flushing for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. (P338)

4.3 - Skin Contact

Skin contact: Immediately wash skin with soap and plenty of water. Remove contaminated clothing. Get medical attention if symptoms occur. Wash clothing before reuse. (P360)

4.4 - Inhalation

Inhalation: Remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Seek immediate medical attention.

4.5 - Ingestion

Ingestion: Do NOT induce vomiting. Call a physician or poison control center immediately. Never give anything by mouth to an unconscious person. (P331)

SECTION 5 - FIRE FIGHTING MEASURES

5.1 - Flammable Properties

Dangerous fire and explosive hazard.

Containers can build up pressure if exposed to heat.

Vapors can travel to a source of ignition and flash back.

During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

5.2 - Extinguishing Media

Use alcohol foam, carbon dioxide, dry chemical, or water spray when fighting fires involving this material.

5.3 - Protection of Firefighters

As in any fire, wear self-contained breathing apparatus pressure demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

6.1 - Spill Response

Wear suitable protective equipment listed under Exposure Controls / Personal Protection. Eliminate any ignition sources until the area is determined to be free from explosion or fire hazards. Contain the release and eliminate its source, if this can be done without risk. Dispose as hazardous waste. Comply with Federal, State and local regulations.

SECTION 7 - HANDLING AND STORAGE

Store in a tightly closed container. (P404)

Keep refrigerated.

Avoid breathing vapors or mists.

Use with adequate ventilation.

Do not get in eyes, on skin or clothing. (P262)

Avoid prolonged or repeated exposure.

This product should only by used by persons trained in the safe handling of hazardous chemicals. (P202)

SECTION 8 - EXPOSURE CONTROLS

8.1 - Engineering Controls/PPE

Wash thoroughly after handling. Do not take internally. Eye wash and safety equipment should be readily available. (P264)

8.2 - General Hygene Considerations

Respiratory Protection: If workplace exposure limit(s) of product or any component is exceeded (see TLV/PEL), or a risk assessment shows air-purifying respirators are appropriate, use of a NIOSH/MSHA approved air supplied respirator is advised. Use a full-face respirator with multi-purpose combination (US) or type ABEK (EN14387) respirator cartridges in absence of proper environmental control. Always use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Engineering and/or administrative controls should be implemented to reduce exposure.

Material should be handled or transferred in an approved fume hood or with adequate ventilation.

Protective gloves must be worn to prevent skin contact. (P280)

(Chloroprene, natural rubber, nitrile, or equivalent)

Use eye protection tested and approved under the appropriate government standards such as NIOSH (US) or EN 166 (EU).

All recommendations are advisory only and must be evaluated by an industrial hygienist and/or safety officer familiar with the specific situation of anticipated use, such as concentration and amount of the substance in the workplace. Any recommendation should not be construed as offering an approval for any specific use of the product.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Clear liquid

Odor: N/A

Odor Threshold: N/A

pH: N/A

Melting Point: -93.9 °C

Boiling Point: 65 °C

Flash Point: 52 °F (11 °C) (tcc)

Evaporation Rate (Butyl Acetate=1): 5.9

Flammability Class: N/A

Lower Flammability Level: 6.7

Upper Flammability Level: 36.5

Vapor Pressure: 97 mmHg (20 °C)

Vapor Density (Air = 1): 1.1 g/L

Specific Gravity: 0.791 g/cm3

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES *- continued*

Solubility in Water: Very soluble

Partition Coefficient: log Pow: -0.77

Autoignition Temperature: 385 °C

Decomposition Temperature: N/A

Viscosity: N/A

VOC Content: N/A

Percent Volatile: 99.9+

SECTION 10 - STABILITY AND REACTIVITY

Stability: Stable

Materials to Avoid: Acids
Oxidizers

Hazardous Decomposition: Oxides of carbon; Formaldehyde

Hazardous Polymerization: Will not occur

Condition to Avoid: Heat; Contact with ignition sources

SECTION 11 - TOXICOLOGICAL INFORMATION

Human Health Toxicity

See section 2 for specific toxicological information for the ingredients of this product.

LD50 (Oral): Human - 143 mg/kg; Rat - 1500 mg/kg

LD50 (Dermal) : Rabbit - >2000 mg/kg

LC50 (Inhalation): Rat - >20 mg/L

WARNING: This product contains chemicals known to the state of California to cause birth defects or other reproductive harm.

No other information related to the toxicological properties of this product is available at this time.

SECTION 12 - ECOLOGICAL INFORMATION

Environmental Toxicity

By complying with sections 6 and 7 there should be no release to the environment.

LC50 (Fish): >1000 mg/L 96H

EC50 (Aquatic Invertebrate): >1000 mg/L 48H

BCF: 1.0

Hydrolyzes readily on contact with water. Readily biodegradable.

No other information related to the ecological properties of this product is available at this time.

SECTION 13 - DISPOSAL CONSIDERATIONS

Recycle or incinerate at any EPA approved facility or dispose in compliance with Federal, State and local regulations. Empty containers must be triple-rinsed prior to disposal.

SECTION 14 - TRANSPORT INFORMATION

Transportation Information (DOT/IATA)

SECTION 14 - TRANSPORT INFORMATION *- continued*

UN Number: UN1230

Class: 3

Packing Group: II

Proper Shipping Name: Methanol

Poison by Inhalation: No

Marine Pollutant: No

SECTION 15 - REGULATORY INFORMATION

WARNING: This product contains chemicals known to the state of California to cause birth defects or other reproductive harm.

This product is subject to SARA section 313 reporting requirements.

All components are listed on the TSCA Inventory.

For laboratory, research and development use only. Not for manufacturing or commercial purposes.

In addition to federal and state regulations, local regulations may apply. Check with your local regulatory authorities.

SECTION 16 - OTHER INFORMATION

This document has been designed to meet the requirements of OSHA, ANSI, GHS and CHIPs regulations. Chemicals are classified using the Globally Harmonized System for Classification and Labeling of Chemicals.

The statements contained herein are offered for informational purposes only and are based on technical data that we believe to be accurate. The manufacturer will not assume any liability for the accuracy and completeness of this information. Final determination of the suitability of the material is the responsibility of the user. Although certain hazards are described herein, the user should not presume that these are the only hazards that exist. Since conditions and manner of use are outside of the manufacturers control, we make

NO WARRANTY OF MERCHANTABILITY, EXPRESSED OR IMPLIED, AND ASSUME NO LIABILITY RESULTING FROM ITS USE.

Legend : N/A = Not Available ND = Not Determined NR = Not Regulated

Alteration of any information contained herein without written permission from the manufacturer is strictly prohibited.

HMIS/NFPA HAZARD INDEX

0 - Minimal
1 - Slight
2 - Moderate
3 - Serious
4 - Severe

* - Additional Hazard

GHS HAZARD INDEX

Category 1 - Most Severe
Category 5 - Least Severe

**** End of Document ****

SAFETY DATA SHEET

Santa Cruz Biotechnology, Inc.
Revision date 11-Dec-2015
Version 1

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product identifier

Product Name	Perfluorononanoic acid
Product Code	SC-250678

Recommended use of the chemical and restrictions on use

For research use only. Not intended for diagnostic or therapeutic use.

Details of the supplier of the safety data sheet

Santa Cruz Biotechnology, Inc.
10410 Finnell Street
Dallas, TX 75220
831.457.3800
800.457.3801
scbt@scbt.com

Emergency telephone number

Chemtrec
1.800.424.9300 (Within USA)
+1.703.527.3887 (Outside USA)

2. HAZARDS IDENTIFICATION

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification

Skin corrosion/irritation	Category 1 Sub-category C
Serious eye damage/eye irritation	Category 1

Label elements

Signal word	Danger
Hazard statements	Causes severe skin burns and eye damage
Symbols/Pictograms	
Precautionary Statements - Prevention	Do not breathe dust/fume/gas/mist/vapors/spray Wash face, hands and any exposed skin thoroughly after handling Wear protective gloves/protective clothing/eye protection/face protection
Precautionary Statements - Response	Immediately call a POISON CENTER or doctor/physician IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing Immediately call a POISON CENTER or doctor/physician IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower Wash contaminated clothing before reuse IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing Immediately call a POISON CENTER or doctor/physician IF SWALLOWED: Rinse mouth. DO NOT induce vomiting
Precautionary Statements - Storage	Store locked up
Precautionary Statements - Disposal	Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

Hazards not otherwise classified (HNOC)	Not applicable

Other Information

Unknown acute toxicity	100% of the mixture consists of ingredient(s) of unknown toxicity.

NFPA			HMIS		
	Health hazards	-		Health hazards	3
	Flammability	-		Flammability	1
	Stability	-		Physical hazards	1
	Physical and chemical properties	-		Personal protection	-

3. COMPOSITION/INFORMATION ON INGREDIENTS

CAS No	375-95-1
Molecular Weight	464.08
Formula	$C_9HF_{17}O_2$

Chemical Name	CAS No	Weight %	Oral LD50	Dermal LD50	Inhalation LC50
Perfluorononanoic acid	375-95-1	>98	-	-	-

4. FIRST AID MEASURES

First Aid Measures

General advice	Consult a physician if necessary. Remove to fresh air.
Eye contact	Wash with plenty of water.
Skin Contact	Wash skin with soap and water.
Inhalation	Remove to fresh air If breathing is difficult, give oxygen If not breathing, give artificial respiration
Ingestion	Never give anything by mouth to an unconscious person. Clean mouth with water.

Most important symptoms and effects, both acute and delayed

Symptoms	No information available.

Indication of any immediate medical attention and special treatment needed

Note to physicians	Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media

Suitable Extinguishing Media	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Unsuitable Extinguishing Media	None.

Specific hazards arising from the chemical

Specific hazards arising from the chemical	Thermal decomposition can lead to release of toxic/corrosive gases and vapors.
Hazardous combustion products	Hydrogen fluoride. Carbon oxides. Phosgene.

Explosion data

Sensitivity to Mechanical Impact	No information available.
Sensitivity to Static Discharge	No information available.

Protective equipment and precautions for firefighters

Protective equipment and precautions for firefighters	As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal precautions	Ensure adequate ventilation, especially in confined areas.

Environmental precautions

Environmental precautions	See Section 12 for additional Ecological Information.

Methods and material for containment and cleaning up

Methods for containment	Prevent further leakage or spillage if safe to do so.
Methods for cleaning up	Use personal protective equipment as required. Cover powder spill with plastic sheet or tarp to minimize spreading and keep powder dry. Take up mechanically, placing in appropriate containers for disposal. Avoid creating dust. Clean contaminated surface thoroughly.

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling	Thermal decomposition can lead to release of toxic/corrosive gases and vapors.

Conditions for safe storage, including any incompatibilities

Storage Conditions	Keep containers tightly closed in a dry, cool and well-ventilated place. Store at room temperature.
Incompatible materials	None known based on information supplied.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines	This product, as supplied, does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Appropriate engineering controls

Engineering Controls	Showers Eyewash stations Ventilation systems

Individual protection measures, such as personal protective equipment

Eye/face protection	Wear safety glasses with side shields (or goggles).
Skin and Body Protection	Wear protective gloves and protective clothing.
Respiratory protection	If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.
General Hygiene Considerations	Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Solid
Appearance	crystalline powder
Odor	No information available

Property	**Values**
pH	No information available
Melting point/freezing point	63 °C
Boiling point	218 °C
Flash point	No information available
Density	No information available
Evaporation rate	No information available
Upper flammability limits	No information available
Lower flammability limit	No information available
Vapor pressure	No information available
Vapor density	No information available
Specific gravity	No information available
Water solubility	No information available
Solubility in other solvents	No information available
Partition coefficient	No information available
Autoignition temperature	No information available
Decomposition temperature	No information available
Kinematic viscosity	No information available
Explosive properties	No information available
Oxidizing properties	No information available

10. STABILITY AND REACTIVITY

Reactivity	Not applicable
Chemical stability	Stable under recommended storage conditions.
Possibility of Hazardous Reactions	None under normal processing.
Hazardous polymerization	No information available.
Conditions to avoid	Extremes of temperature and direct sunlight.
Incompatible materials	Strong oxidizing agents.
Hazardous Decomposition Products	Hydrogen fluoride. Carbon oxides. Phosgene.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Inhalation	No data available.
Eye contact	No data available.
Skin Contact	No data available.
Ingestion	No data available.

Information on toxicological effects

Symptoms	No information available.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Chronic Toxicity	No information available.

Numerical measures of toxicity - Product Information

Unknown acute toxicity	100% of the mixture consists of ingredient(s) of unknown toxicity

12. ECOLOGICAL INFORMATION

Ecotoxicity	May cause long lasting harmful effects to aquatic life

100% of the mixture consists of components(s) of unknown hazards to the aquatic environment.

Persistence and degradability	No information available.
Bioaccumulation	No information available.
Mobility	No information available.

13. DISPOSAL CONSIDERATIONS

Disposal of wastes	Disposal should be in accordance with applicable regional, national and local laws and regulations.
Contaminated packaging	Do not reuse container.

14. TRANSPORT INFORMATION

DOT	Not regulated
IMDG	Not regulated
IATA	Not regulated

15. REGULATORY INFORMATION

International Inventories

All of the components in the product are on the following Inventory lists
TSCA (United States): Canada (DSL/NDSL) Europe (EINECS/ELINCS/NLP) ENCS (Japan):

Chemical Name	TSCA	DSL	NDSL	EINECS	ELINCS	ENCS	IECSC	KECL	PICCS	AICS
Perfluorononanoic acid	X	-	X	X	-	X	-	-	-	-

X - Listed
TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances

US Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

SARA 311/312 Hazard Categories

Acute health hazard	No
Chronic Health Hazard	No
Fire hazard	No
Sudden release of pressure hazard	No
Reactive hazard	No

CWA (Clean Water Act)
This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42).

US State Regulations

California Proposition 65
This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations
This product does not contain any substances regulated by state right-to-know regulations

16. OTHER INFORMATION

Revision note	No information available

Disclaimer
The information provided in this Material Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

End of Safety Data Sheet

SAFETY DATA SHEET

Version 6.4
Revision Date 04/18/2021
Print Date 06/19/2021

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Perfluorooctanoic acid

Product Number : 171468
Brand : Aldrich
CAS-No. : 335-67-1

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 4), H302
Skin corrosion (Category 1B), H314
Serious eye damage (Category 1), H318
Carcinogenicity (Category 2), H351
Reproductive toxicity (Category 1B), H360
Effects on or via lactation, H362
Specific target organ toxicity - repeated exposure (Category 1), Liver, H372

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Signal word	Danger
Hazard statement(s)	
H302	Harmful if swallowed.
H314	Causes severe skin burns and eye damage.
H351	Suspected of causing cancer.
H360	May damage fertility or the unborn child.
H362	May cause harm to breast-fed children.
H372	Causes damage to organs (Liver) through prolonged or repeated exposure.
Precautionary statement(s)	
P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust/ fume/ gas/ mist/ vapors/ spray.
P263	Avoid contact during pregnancy/ while nursing.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell. Rinse mouth.
P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/ doctor.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P363	Wash contaminated clothing before reuse.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Pentadecafluorooctanoic acid Perfluorocaprylic acid Perfluorooctanoic acid
Formula	:	$C_8HF_{15}O_2$
Molecular weight	:	414.07 g/mol
CAS-No.	:	335-67-1
EC-No.	:	206-397-9

Component	Classification	Concentration
pentadecafluorooctanoic acid		
	Acute Tox. 4; Skin Corr.	<= 100 %

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

	1B; Eye Dam. 1; Carc. 2; Repr. 1B; Lact. ; STOT RE 1; H302, H314, H318, H351, H360, H362, H372	

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
First aiders need to protect themselves. Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Call in physician.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Call a physician immediately.

In case of eye contact
After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist. Remove contact lenses.

If swallowed
After swallowing: make victim drink water (two glasses at most), avoid vomiting (risk of perforation). Call a physician immediately. Do not attempt to neutralise.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Water Foam Carbon dioxide (CO2) Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

Carbon oxides
Hydrogen fluoride
Combustible.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

5.4 Further information

Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Avoid generation and inhalation of dusts in all circumstances. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully. Dispose of properly. Clean up affected area. Avoid generation of dusts.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Work under hood. Do not inhale substance/mixture.

Hygiene measures
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Dry. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.
Storage class (TRGS 510): 6.1C: Combustible, acute toxic Cat.3 / toxic compounds or compounds which causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters
Contains no substances with occupational exposure limit values.

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8.2 Exposure controls

Appropriate engineering controls
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Tightly fitting safety goggles

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: > 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: > 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the EC approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Acid-resistant protective clothing

Respiratory protection
required when dusts are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: flakes Color: colorless

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b)	Odor	stinging
c)	Odor Threshold	No data available
d)	pH	2.6 at 1 g/l at 20 °C (68 °F)
e)	Melting point/freezing point	Melting point/range: 55 - 56 °C (131 - 133 °F) - lit.
f)	Initial boiling point and boiling range	189 °C 372 °F at 981 hPa - lit.
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	0.69 hPa at 25 °C (77 °F)
l)	Vapor density	No data available
m)	Relative density	No data available
n)	Water solubility	3.4 g/l at 20 °C (68 °F)
o)	Partition coefficient: n-octanol/water	log Pow: 6.30 - Potential bioaccumulation, (Lit.)
p)	Autoignition temperature	No data available
q)	Decomposition temperature	> 300 °C (> 572 °F) -
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

The following applies in general to flammable organic substances and mixtures: in correspondingly fine distribution, when whirled up a dust explosion potential may generally be assumed.

10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions

Violent reactions possible with:
Strong oxidizing agents
Strong acids
Bases

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10.4 Conditions to avoid
no information available

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
Acute toxicity estimate Oral - 500.1 mg/kg
(Expert judgment)

Acute toxicity estimate Inhalation - 4 h - 11.1 mg/l
(Expert judgment)

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
Causes serious eye damage.

Respiratory or skin sensitization

Germ cell mutagenicity
No data available

No data available
No data available

Carcinogenicity
Suspected of causing cancer.

IARC: 2B - Group 2B: Possibly carcinogenic to humans (pentadecafluorooctanoic acid)

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
May damage the unborn child.
Studies indicating a hazard to babies during the lactation period

Specific target organ toxicity - single exposure

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Specific target organ toxicity - repeated exposure
Causes damage to organs through prolonged or repeated exposure. - Liver

Aspiration hazard

11.2 Additional Information

RTECS: RH0781000

Cough, Shortness of breath, Headache, Nausea, Vomiting
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

After absorption:

gastric pain
Nausea
Vomiting
Drowsiness
somnolence

Handle in accordance with good industrial hygiene and safety practice.

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

No data available

Toxicity to daphnia and other aquatic invertebrates	Remarks: No data available (pentadecafluorooctanoic acid)
Toxicity to algae	Remarks: No data available (pentadecafluorooctanoic acid)

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

Discharge into the environment must be avoided.

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SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself. See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14: Transport information

DOT (US)
UN number: 3261 Class: 8 Packing group: III
Proper shipping name: Corrosive solid, acidic, organic, n.o.s. (pentadecafluorooctanoic acid)
Reportable Quantity (RQ):
Poison Inhalation Hazard: No

IMDG
UN number: 3261 Class: 8 Packing group: III EMS-No: F-A, S-B
Proper shipping name: CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S. (pentadecafluorooctanoic acid)

IATA
UN number: 3261 Class: 8 Packing group: III
Proper shipping name: Corrosive solid, acidic, organic, n.o.s. (pentadecafluorooctanoic acid)

SECTION 15: Regulatory information

SARA 302 Components
This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
pentadecafluorooctanoic acid	335-67-1	2018-02-01

New Jersey Right To Know Components

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SECTION 16: Other information

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.4 Revision Date: 04/18/2021 Print Date: 06/19/2021

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SAFETY DATA SHEET

Version 6.1
Revision Date 09/29/2020
Print Date 07/25/2021

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Perfluorooctanesulfonamide

Product Number : CDS010729
Brand : Aldrich
CAS-No. : 754-91-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Long-term (chronic) aquatic hazard (Category 4), H413

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram none

Signal word none

Hazard statement(s)
H413 May cause long lasting harmful effects to aquatic life.

Precautionary statement(s)
P273 Avoid release to the environment.
P501 Dispose of contents/ container to an approved waste disposal

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plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Heptadecafluorooctanesulphonamide
Formula	:	$C_8H_2F_{17}NO_2S$
Molecular weight	:	499.14 g/mol
CAS-No.	:	754-91-6
EC-No.	:	212-046-0

No components need to be disclosed according to the applicable regulations.

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Consult a physician. Show this material safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

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5.2 Special hazards arising from the substance or mixture
Carbon oxides, Nitrogen oxides (NOx), Sulfur oxides, Hydrogen fluoride

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.
Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.
Storage class (TRGS 510): 13: Non Combustible Solids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

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Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection
Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odor	No data available
c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	120 °C 248 °F at 3 hPa
g)	Flash point	()No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Relative density	No data available
n)	Water solubility	No data available

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o)	Partition coefficient: n-octanol/water	log Pow: 5.8
p)	Autoignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Nitrogen oxides (NOx), Sulfur oxides, Hydrogen fluoride
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
Causes serious eye damage.

Respiratory or skin sensitization

Germ cell mutagenicity
No data available
No data available
No data available

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Carcinogenicity
Suspected of causing cancer.

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
May damage the unborn child.
Studies indicating a hazard to babies during the lactation period

Specific target organ toxicity - single exposure

Specific target organ toxicity - repeated exposure
Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard

Additional Information
RTECS: RG9701400

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Handle in accordance with good industrial hygiene and safety practice.

SECTION 12: Ecological information

12.1 Toxicity
No data available

Toxicity to daphnia and other aquatic invertebrates	Remarks: No data available(Heptadecafluorooctanesulphonamide)
Toxicity to algae	Remarks: No data available(Heptadecafluorooctanesulphonamide)

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
Accumulation in aquatic organisms is expected.

12.4 Mobility in soil

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Discharge into the environment must be avoided.

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SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

DOT (US)
Not dangerous goods

IMDG
Not dangerous goods

IATA
Not dangerous goods

Further information
Not classified as dangerous in the meaning of transport regulations.

SECTION 15: Regulatory information

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
No SARA Hazards

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

Heptadecafluorooctanesulphonamide	CAS-No. 754-91-6	Revision Date

New Jersey Right To Know Components

Heptadecafluorooctanesulphonamide	CAS-No. 754-91-6	Revision Date

California Prop. 65 Components

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This product does not contain any chemicals known to the State of California to cause cancer, birth, or any other reproductive defects.

SECTION 16: Other information

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.1 Revision Date: 09/29/2020 Print Date: 07/25/2021

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SAFETY DATA SHEET

Version 6.9
Revision Date 08/28/2024
Print Date 08/29/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Heptadecafluorooctanesulfonic acid solution

Product Number : 77283
Brand : Aldrich

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 4), H302
Carcinogenicity (Category 2), H351
Reproductive toxicity (Category 1B), H360
Effects on or via lactation, H362
Specific target organ toxicity - repeated exposure (Category 1), H372

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Long-term (chronic) aquatic hazard (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal Word Danger

Hazard Statements

H302	Harmful if swallowed.
H351	Suspected of causing cancer.
H360	May damage fertility or the unborn child.
H362	May cause harm to breast-fed children.
H372	Causes damage to organs through prolonged or repeated exposure.
H411	Toxic to aquatic life with long lasting effects.

Precautionary Statements

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe mist or vapors.
P263	Avoid contact during pregnancy/ while nursing.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell. Rinse mouth.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Formula : $C_8HF_{17}O_3S$

Molecular weight : 500.13 g/mol

Component		Classification	Concentration
Heptadecafluorooctane-1-sulphonic acid			
CAS-No. EC-No. Index-No.	1763-23-1 217-179-8 607-624-00-8	Acute Tox. 4; Carc. 2; Repr. 1B; Lact. ; STOT RE 1; Aquatic Chronic 2; H302, H332, H351, H360,	>= 30 - < 50 %

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	H362, H372, H411	

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Call in physician.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

In case of eye contact
After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

If swallowed
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Water Foam Carbon dioxide (CO2) Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Carbon oxides
Sulfur oxides
Hydrogen fluoride
Mixture with combustible ingredients.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

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5.4 Further information

Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

Hygiene measures
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.

Storage class
Storage class (TRGS 510): 6.1C: Combustible, acute toxic Cat.3 / toxic compounds or compounds which causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

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operates as MilliporeSigma in the US and Canada

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
required

Body Protection
protective clothing

Respiratory protection
Recommended Filter type: Filter type ABEK
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when vapours/aerosols are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: clear, liquid Color: light red
b)	Odor	No data available
c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	No data available

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g)	Flash point	()No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Density	1.250 g/cm3
	Relative density	No data available
n)	Water solubility	soluble
o)	Partition coefficient: n-octanol/water	No data available
p)	Autoignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	Not classified as explosive.
t)	Oxidizing properties	none

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
In the event of fire: see section 5

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SECTION 11: Toxicological information

11.1 Information on toxicological effects

Mixture

Acute toxicity
Oral: No data available

Inhalation: No data available

Dermal: No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

Evidence of a carcinogenic effect.

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Heptadecafluorooctane-1-sulphonic acid)

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
May harm the unborn child.
May impair fertility.

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
Mixture causes damage to organs through prolonged or repeated exposure.

Aspiration hazard
No data available

11.2 Additional Information

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin.
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.
Other dangerous properties can not be excluded.

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This substance should be handled with particular care.

Handle in accordance with good industrial hygiene and safety practice.

Components

Heptadecafluorooctane-1-sulphonic acid

Acute toxicity
Acute toxicity estimate Oral - 500.1 mg/kg
(Expert judgment)
Acute toxicity estimate Inhalation - 4 h - 11.1 mg/l - vapor
(Expert judgment)
Dermal: No data available

Skin corrosion/irritation
Remarks: No data available

Serious eye damage/eye irritation
Remarks: Causes serious eye damage.

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available
No data available
No data available

Carcinogenicity
Suspected of causing cancer.

Reproductive toxicity
May damage the unborn child.
Studies indicating a hazard to babies during the lactation period

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard
No data available

SECTION 12: Ecological information

12.1 Toxicity

Mixture
No data available

12.2 Persistence and degradability
No data available

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12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties
No data available

12.7 Other adverse effects
No data available

Components

Heptadecafluorooctane-1-sulphonic acid
No data available

Toxicity to daphnia and other aquatic invertebrates	Remarks: No data available
Toxicity to algae	Remarks: No data available
Toxicity to daphnia and other aquatic invertebrates(Chronic toxicity)	Remarks: No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself. See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14: Transport information

DOT (US)
Not dangerous goods

IMDG

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UN number: 3082 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Heptadecafluorooctane-1-sulphonic acid)
Marine pollutant : yes
Marine pollutant : no

IATA

UN number: 3082 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, liquid, n.o.s. (Heptadecafluorooctane-1-sulphonic acid)

Further information

EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.Packages smaller than or equal to 5 kg / L , not dangerous goods of Class 9

SECTION 15: Regulatory information

CERCLA Reportable Quantity

This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Acute Health Hazard
Chronic Health Hazard

SARA 313 : The following components are subject to reporting levels established by SARA Title III, Section 313:

Heptadecafluorooctane-1-sulphonic acid	1763-23-1	>= 30 - < 50 %

US State Regulations

Massachusetts Right To Know

No components are subject to the Massachusetts Right to Know Act.

Massachusetts Right To Know

water	7732-18-5

Pennsylvania Right To Know

water	7732-18-5
Heptadecafluorooctane-1-sulphonic acid	1763-23-1

Maine Chemicals of High Concern

water	7732-18-5
Heptadecafluorooctane-1-sulphonic acid	1763-23-1

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Vermont Chemicals of High Concern

water	7732-18-5
Heptadecafluorooctane-1-sulphonic acid	1763-23-1

Washington Chemicals of High Concern

water	7732-18-5
Heptadecafluorooctane-1-sulphonic acid	1763-23-1

New Jersey Right To Know

water	7732-18-5
Heptadecafluorooctane-1-sulphonic acid	1763-23-1

California Prop. 65

WARNING: This product can expose you to chemicals including Heptadecafluorooctane-1-sulphonic acid, which is/are known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

International Regulations

Rotterdam Convention (Prior Informed Consent)	:	Heptadecafluorooctane-1-sulphonic acid
Stockholm Convention (Persistent Organic Pollutants)	:	Heptadecafluorooctane-1-sulphonic acid

The ingredients of this product are reported in the following inventories:

TSCA	:	All substances listed as active on the TSCA inventory

TSCA list

The following substance(s) is/are subject to a Significant New Use Rule:

Heptadecafluorooctane-1-sulphonic acid	1763-23-1	See 40 CFR § 721.9582; Final Rule

The following substance(s) is/are subject to TSCA 12(b) export notification requirements:

Heptadecafluorooctane-1-sulphonic acid	1763-23-1

SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.9 Revision Date: 08/28/2024 Print Date: 08/29/2024

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SAFETY DATA SHEET

Version 6.2
Revision Date 04/30/2021
Print Date 06/19/2021

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Perfluoropentanoic acid

Product Number : 396575
Brand : Aldrich
CAS-No. : 2706-90-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Serious eye damage (Category 1), H318
Reproductive toxicity (Category 2), H361

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H318 Causes serious eye damage.
H361 Suspected of damaging fertility or the unborn child.

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Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/ doctor.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms : Nonafluorovaleric acid
Perfluoropentanoic acid
Nonafluoropentanoic acid

Formula : $C_5HF_9O_2$
Molecular weight : 264.05 g/mol
CAS-No. : 2706-90-3
EC-No. : 220-300-7

Component	Classification	Concentration
Perfluorovaleric acid		
	Eye Dam. 1; Repr. 2; H318, H361	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Call in physician.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

In case of eye contact
After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist. Remove contact lenses.

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If swallowed
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Water Foam Carbon dioxide (CO2) Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Carbon oxides
Hydrogen fluoride
Combustible.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information
Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections
For disposal see section 13.

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SECTION 7: Handling and storage

7.1 Precautions for safe handling

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Keep locked up or in an area accessible only to qualified or authorized persons.
Storage class (TRGS 510): 8A: Combustible, corrosive hazardous materials

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Change contaminated clothing. Preventive skin protection recommended. Wash hands after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Tightly fitting safety goggles

Skin protection
required

Body Protection
protective clothing

Respiratory protection
required when vapours/aerosols are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: clear, liquid Color: light brown
b)	Odor	No data available

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c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	140 °C 284 °F - lit.
g)	Flash point	()No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Autoignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
Strong oxidizing agents

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10.6 Hazardous decomposition products

In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
Acute toxicity estimate Oral - 2,501 mg/kg
(Expert judgment)

Inhalation: No data available

Dermal: No data available
No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
Suspected of damaging the unborn child.
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

Not available

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Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., Cough, Shortness of breath, Headache, Nausea

SECTION 12: Ecological information

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself. See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14: Transport information

DOT (US)
Not dangerous goods

IMDG
Not dangerous goods

IATA
Not dangerous goods

Further information
Not classified as dangerous in the meaning of transport regulations.

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SECTION 15: Regulatory information

SARA 302 Components
This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
No SARA Hazards

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

SECTION 16: Other information

Further information
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.2 Revision Date: 04/30/2021 Print Date: 06/19/2021

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SAFETY DATA SHEET

Version 6.1
Revision Date 04/05/2019
Print Date 06/19/2021

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Perfluorotridecanoic acid

Product Number : 654973
Brand : Aldrich
CAS-No. : 72629-94-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture.

2.2 GHS Label elements, including precautionary statements

Not a hazardous substance or mixture.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula : $C_{13}HF_{25}O_2$
Molecular weight : 664.11 g/mol
CAS-No. : 72629-94-8

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EC-No. : 276-745-2

No components need to be disclosed according to the applicable regulations.

SECTION 4: First aid measures

4.1 Description of first aid measures

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration.

In case of skin contact
Wash off with soap and plenty of water.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides, Hydrogen fluoride

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Avoid dust formation. Avoid breathing vapours, mist or gas.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

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SECTION 7: Handling and storage

7.1 Precautions for safe handling

Provide appropriate exhaust ventilation at places where dust is formed.Normal measures for preventive fire protection.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.
Storage class (TRGS 510): 13: Non Combustible Solids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
General industrial hygiene practice.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection
Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Do not let product enter drains.

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SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 112 - 123 °C (234 - 253 °F) - lit.
f)	Initial boiling point and boiling range	No data available
g)	Flash point	()No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

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10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen fluoride
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
No data available
Inhalation: No data available
Dermal: No data available
No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

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Additional Information
RTECS: Not available

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

DOT (US)
Not dangerous goods

IMDG
Not dangerous goods

IATA
Not dangerous goods

SECTION 15: Regulatory information

SARA 302 Components

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No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
No SARA Hazards

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

Pentacosafluorotridecanoic acid	CAS-No. 72629-94-8	Revision Date

New Jersey Right To Know Components

Pentacosafluorotridecanoic acid	CAS-No. 72629-94-8	Revision Date

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

SECTION 16: Other information

Further information
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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.1 Revision Date: 04/05/2019 Print Date: 06/19/2021

The life science business of Merck KGaA, Darmstadt, Germany
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SAFETY DATA SHEET

Creation Date 01-May-2012 **Revision Date** 11-Aug-2014 **Revision Number** 1

1. Identification

Product Name **Phenanthrene**

Cat No. : **AC130090000; AC130090050; AC130090500; AC130095000**

Synonyms No information available

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Entity / Business Name
Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute oral toxicity	Category 4

Label Elements

Signal Word
Warning

Hazard Statements
Harmful if swallowed

Precautionary Statements
Prevention
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Ingestion
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
Rinse mouth

Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Very toxic to aquatic life with long lasting effects

3. Composition / information on ingredients

Component	CAS-No	Weight %
Phenanthrene	85-01-8	>95

4. First-aid measures

General Advice If symptoms persist, call a physician.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.

Skin Contact Obtain medical attention. Wash off immediately with plenty of water for at least 15 minutes.

Inhalation Move to fresh air. If breathing is difficult, give oxygen. Obtain medical attention.

Ingestion Clean mouth with water and drink afterwards plenty of water. Get medical attention if symptoms occur.

Most important symptoms/effects None reasonably foreseeable.
Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature Not applicable
Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Do not allow run-off from fire fighting to enter drains or water courses.

Hazardous Combustion Products
Carbon monoxide (CO) Carbon dioxide (CO_2)
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
1	1	0	N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment. Avoid dust formation.

Environmental Precautions Do not flush into surface water or sanitary sewer system. Do not allow material to contaminate ground water system. Prevent product from entering drains. Local authorities should be advised if significant spillages cannot be contained. See Section 12 for additional ecological information. Avoid release to the environment. Collect spillage.

Methods for Containment and Clean Up Sweep up or vacuum up spillage and collect in suitable container for disposal. Keep in suitable, closed containers for disposal.

7. Handling and storage

Handling Wear personal protective equipment. Ensure adequate ventilation. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation. Avoid dust formation.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Engineering Measures Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

- **Eye/face Protection** Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
- **Skin and body protection** Long sleeved clothing.
- **Respiratory Protection** Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.
- **Hygiene Measures** Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Solid
Appearance	Beige
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	95 - 101 °C / 203 - 213.8 °F
Boiling Point/Range	336 °C / 636.8 °F
Flash Point	No information available
Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	1 mmHg @ 116 °C
Vapor Density	Not applicable
Relative Density	1.063
Solubility	Insoluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	Not applicable
Decomposition temperature	No information available
Viscosity	Not applicable
Molecular Formula	C14 H10
Molecular Weight	178.23

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products. Excess heat. Avoid dust formation.

Incompatible Materials Strong oxidizing agents

Hazardous Decomposition Products Carbon monoxide (CO), Carbon dioxide (CO_2)

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Phenanthrene	1.8 g/kg (Rat)	Not listed	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Phenanthrene	85-01-8	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known

STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated. See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. The product contains following substances which are hazardous for the environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea

Phenanthrene	Not listed	LC50 = 3.2 mg/L 96h	Not listed	LC50 = 0.35 mg/L 48h

Persistence and Degradability Insoluble in water May persist

Bioaccumulation/ Accumulation No information available.

Mobility . Is not likely mobile in the environment due its low water solubility.

Component	log Pow
Phenanthrene	4.46

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No UN3077
Proper Shipping Name ENVIRONMENTALLY HAZARDOUS SUBSTANCE,SOLID, N.O.S.
Hazard Class 9
Packing Group III

TDG

UN-No UN3077
Proper Shipping Name ENVIRONMENTALLY HAZARDOUS SUBSTANCE,SOLID, N.O.S.
Hazard Class 9
Packing Group III

IATA

UN-No UN3077
Proper Shipping Name ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.*
Hazard Class 9
Packing Group III

IMDG/IMO

UN-No UN3077
Proper Shipping Name ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.
Hazard Class 9
Packing Group III

15. Regulatory information

All of the components in the product are on the following Inventory lists: X = listed

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Phenanthrene	X	X	-	201-581-5	-		X	X	X	X	X

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Phenanthrene	85-01-8	>95	1.0

SARA 311/312 Hazardous Categorization

Acute Health Hazard	Yes
Chronic Health Hazard	No
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Phenanthrene	-	-	X	X

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Phenanthrene	5000 lb	-

California Proposition 65 This product does not contain any Proposition 65 chemicals

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Phenanthrene	X	X	X	-	-

U.S. Department of Transportation

Reportable Quantity (RQ):	N
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class Non-controlled

16. Other information

Prepared By Regulatory Affairs

Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date	01-May-2012
Revision Date	11-Aug-2014
Print Date	11-Aug-2014
Revision Summary	This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer

The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS

SAFETY DATA SHEET

Version 6.10
Revision Date 09/06/2024
Print Date 09/06/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Potassium chloride

Product Number : P9333
Brand : Sigma-Aldrich
CAS-No. : 7447-40-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture.

2.2 GHS Label elements, including precautionary statements

No hazard pictogram, no signal word, no hazard statement(s), no precautionary statement(s) required.

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2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	KCl
Molecular weight	:	74.55 g/mol
CAS-No.	:	7447-40-7
EC-No.	:	231-211-8

No components need to be disclosed according to the applicable regulations.

SECTION 4: First aid measures

4.1 Description of first-aid measures

If inhaled
After inhalation: fresh air.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

In case of eye contact
After eye contact: rinse out with plenty of water. Remove contact lenses.

If swallowed
After swallowing: make victim drink water (two glasses at most). Consult doctor if feeling unwell.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Hydrogen chloride gas
Potassium oxides
Not combustible.

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Ambient fire may liberate hazardous vapours.

5.3 Advice for firefighters
In the event of fire, wear self-contained breathing apparatus.

5.4 Further information
Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Avoid inhalation of dusts. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up dry. Dispose of properly. Clean up affected area. Avoid generation of dusts.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Dry.

hygroscopic

Storage class
Storage class (TRGS 510): 11: Combustible Solids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters
Contains no substances with occupational exposure limit values.

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8.2 Exposure controls

Appropriate engineering controls

Change contaminated clothing. Wash hands after working with substance.

Personal protective equipment

Eye/face protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the EC approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Respiratory protection

Recommended Filter type: Filter type P1
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when dusts are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure

Do not let product enter drains.

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SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: crystalline, powder Color: white
b)	Odor	odorless
c)	Odor Threshold	Not applicable
d)	pH	5.5 - 8.5 at 50.0 g/l at 20.0 °C (68.0 °F)
e)	Melting point/freezing point	Melting point/ range: 770 °C (1418 °F)
f)	Initial boiling point and boiling range	1,413 °C 2,575 °F at 1,013 hPa
g)	Flash point	()Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Density	1.98 g/mL at 25 °C (77 °F)
	Relative density	1.98
n)	Water solubility	355 g/l at 25 °C (77 °F)
o)	Partition coefficient: n-octanol/water	Not applicable for inorganic substances
p)	Autoignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	Not classified as explosive.
t)	Oxidizing properties	none

9.2 Other safety information

Sublimation point	1,500 °C
Solubility in other solvents	Ethanol 4.0 g/l

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SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Exposure to moisture.
no information available

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
Acute toxicity estimate Oral - 3,020 mg/kg
(Calculation method)
LD50 Oral - Rat - female - 3,020 mg/kg
Remarks: (ECHA)
Inhalation: No data available
Dermal: No data available
No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
Remarks: No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
Test Type: Ames test
Test system: Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative
Remarks: (ECHA)
Test Type: In vitro mammalian cell gene mutation test
Test system: mouse lymphoma cells
Metabolic activation: without metabolic activation
Method: OECD Test Guideline 476
Result: negative

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Remarks: (ECHA)
Test Type: Mutagenicity (mammal cell test): chromosome aberration.
Test system: Chinese hamster lung cells
Metabolic activation: without metabolic activation
Method: OECD Test Guideline 473
Result: positive
Remarks: (ECHA)

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

Repeated dose toxicity - Rat - male - Oral - 2 yr - NOAEL (No observed adverse effect level) - 1,820 mg/kg - LOAEL (Lowest observed adverse effect level) - 110 mg/kg
Remarks: (ECHA)

RTECS: TS8050000
hyperkalemia, Nausea, Vomiting, Abdominal pain, Diarrhea, Constipation., Paresthesia., Thirst, Dizziness, Rash, pruritus, Weakness, muscle cramps, minor psychiatric changes, minor visual changes
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	static test LC50 - Pimephales promelas (fathead minnow) - 880 mg/l - 96 h (OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	static test EC50 - Daphnia magna (Water flea) - 440 - 880 mg/l - 48 h (OECD Test Guideline 202)

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Toxicity to algae	static test ErC50 - Desmodesmus subspicatus (green algae) - > 100 mg/l - 72 h (OECD Test Guideline 201)
Toxicity to bacteria	static test EC50 - activated sludge - > 1,000 mg/l - 3 h (OECD Test Guideline 209)

12.2 Persistence and degradability
The methods for determining biodegradability are not applicable to inorganic substances.

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties
No data available

12.7 Other adverse effects
No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)
Not dangerous goods

IMDG
Not dangerous goods

IATA
Not dangerous goods

Further information
Not classified as dangerous in the meaning of transport regulations.

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SECTION 15: Regulatory information

CERCLA Reportable Quantity

This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : No SARA Hazards

SARA 313 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Clean Air Act

This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).
This product does not contain any hazardous air pollutants (HAP), as defined by the U.S. Clean Air Act Section 112 (40 CFR 61).
This product does not contain any chemicals listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F).
This product does not contain any chemicals listed under the U.S. Clean Air Act Section 111 SOCMI Intermediate or Final VOC's (40 CFR 60.489).

Clean Water Act

This product does not contain any Hazardous Substances listed under the U.S. CleanWater Act, Section 311, Table 116.4A.
This product does not contain any Hazardous Chemicals listed under the U.S. CleanWater Act, Section 311, Table 117.3.
This product does not contain any toxic pollutants listed under the U.S. Clean Water Act Section 307
This product does not contain any priority pollutants related to the U.S. Clean Water Act

US State Regulations

Massachusetts Right To Know

No components are subject to the Massachusetts Right to Know Act.

Maine Chemicals of High Concern

Product does not contain any listed chemicals

Vermont Chemicals of High Concern

Product does not contain any listed chemicals

Washington Chemicals of High Concern

Product does not contain any listed chemicals

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

The ingredients of this product are reported in the following inventories:

TSCA : All substances listed as active on the TSCA inventory

TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.10 Revision Date: 09/06/2024 Print Date: 09/06/2024

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SAFETY DATA SHEET

Version 3.9
Revision Date 05/23/2016
Print Date 06/21/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : *p*-Xylene

Product Number : 95680
Brand : Sigma-Aldrich
Index-No. : 601-022-00-9

CAS-No. : 106-42-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 3), H226
Acute toxicity, Inhalation (Category 4), H332
Acute toxicity, Dermal (Category 4), H312
Skin irritation (Category 2), H315
Acute aquatic toxicity (Category 2), H401

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)
H226 Flammable liquid and vapour.
H312 + H332 Harmful in contact with skin or if inhaled
H315 Causes skin irritation.
H401 Toxic to aquatic life.

Precautionary statement(s)
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P233 Keep container tightly closed.
P240 Ground/bond container and receiving equipment.

P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P312	Call a POISON CENTER/doctor if you feel unwell.
P322	Specific measures (see supplemental first aid instructions on this label).
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P403 + P235	Store in a well-ventilated place. Keep cool.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : 1,4-Dimethylbenzene

Formula : C_8H_{10}

Molecular weight : 106.17 g/mol

CAS-No. : 106-42-3

EC-No. : 203-396-5

Index-No. : 601-022-00-9

Hazardous components

Component	Classification	Concentration
p-Xylene		
	Flam. Liq. 3; Acute Tox. 4; Skin Irrit. 2; Aquatic Acute 2; H226, H312 + H332, H315, H401	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
p-Xylene	106-42-3	TWA	100.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Eye & Upper Respiratory Tract irritation		

		Central Nervous System impairment Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		STEL	150.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Eye & Upper Respiratory Tract irritation Central Nervous System impairment Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		ST	150.000000 ppm 655.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	100.000000 ppm 435.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	100.000000 ppm 435.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		
		TWA	100.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		STEL	150.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		TWA	100 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		STEL	150 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		

		TWA	100 ppm 435 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
p-Xylene	106-42-3	Methylhippuric acids	1.5g/g creatinine	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift (As soon as possible after exposure ceases)			
		Methylhippuric acids	1,500.0000 mg/g	Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift (As soon as possible after exposure ceases)			

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 30 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid, clear Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	13.0 °C (55.4 °F)
f)	Initial boiling point and boiling range	137.0 - 138.0 °C (278.6 - 280.4 °F)
g)	Flash point	25.0 °C (77.0 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 7 %(V) Lower explosion limit: 1.1 %(V)
k)	Vapour pressure	21.3 hPa (16.0 mmHg) at 37.7 °C (99.9 °F) 12.0 hPa (9.0 mmHg) at 20.0 °C (68.0 °F)
l)	Vapour density	No data available
m)	Relative density	0.86 g/cm3
n)	Water solubility	0.2 g/l
o)	Partition coefficient: n-octanol/water	log Pow: 3.15
p)	Auto-ignition temperature	529.0 °C (984.2 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Surface tension	28.3 mN/m at 20.0 °C (68.0 °F)

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Vapours may form explosive mixture with air.

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 5,000 mg/kg

LD50 Oral - Rat - male - 3,523 mg/kg

LC50 Inhalation - Rat - 4 h - 4550 ppm
Remarks: Lungs, Thorax, or Respiration:Chronic pulmonary edema. Liver:Other changes. Blood:Changes in cell count (unspecified).

No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Moderate skin irritation - 4 h

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC:	3 - Group 3: Not classifiable as to its carcinogenicity to humans (p-Xylene)
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

May cause reproductive disorders.

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: ZE2625000

narcosis, Lung irritation, chest pain, pulmonary edema, Central nervous system depression, Gastrointestinal disturbance, Liver injury may occur., Kidney injury may occur., Blood disorders

Stomach - Irregularities - Based on Human Evidence
Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 2.60 mg/l - 96 h
	LC50 - Carassius auratus (goldfish) - 18.00 mg/l - 24 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 35.50 - 63.10 mg/l - 48 h
Toxicity to algae	EC50 - Pseudokirchneriella subcapitata (green algae) - 3.20 - 4.40 mg/l - 72 h

12.2 Persistence and degradability

Biodegradability Result: 87.8 % - Readily biodegradable

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1307 Class: 3 Packing group: III
Proper shipping name: Xylenes
Reportable Quantity (RQ): 100 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 1307 Class: 3 Packing group: III EMS-No: F-E, S-D
Proper shipping name: XYLENES

IATA

UN number: 1307 Class: 3 Packing group: III
Proper shipping name: Xylenes

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
p-Xylene	106-42-3	2007-07-01

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Flam. Liq.	Flammable liquids
H226	Flammable liquid and vapour.
H312	Harmful in contact with skin.
H312 + H332	Harmful in contact with skin or if inhaled
H315	Causes skin irritation.
H332	Harmful if inhaled.

HMIS Rating

Health hazard:	1
Chronic Health Hazard:	*
Flammability:	3
Physical Hazard	0

NFPA Rating

Health hazard:	1
Fire Hazard:	3
Reactivity Hazard:	0

Further information
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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information
Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 3.9 Revision Date: 05/23/2016 Print Date: 06/21/2016

SAFETY DATA SHEET

Creation Date 01-Jul-2010 **Revision Date** 10-Feb-2015 **Revision Number** 1

1. Identification

Product Name **Pyrene**

Cat No. : **AC180830000; AC180830250; AC180831000; AC180835000**

Synonyms Benzo[def]phenanthrene

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Entity / Business Name
Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Skin Corrosion/irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Central nervous system (CNS).	
Specific target organ toxicity - (repeated exposure)	Category 2
Target Organs - Liver.	

Label Elements

Signal Word
Warning

Hazard Statements
Causes skin irritation
Causes serious eye irritation
May cause drowsiness or dizziness
May cause damage to organs through prolonged or repeated exposure

Precautionary Statements
Prevention
Wear protective gloves/protective clothing/eye protection/face protection
Use only outdoors or in a well-ventilated area
Do not breathe dust/fume/gas/mist/vapors/spray
Wash face, hands and any exposed skin thoroughly after handling
Do not get in eyes, on skin, or on clothing
Response
Get medical attention/advice if you feel unwell
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Skin
IF ON SKIN: Wash with plenty of soap and water
Take off contaminated clothing and wash before reuse
If skin irritation occurs: Get medical advice/attention
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
Storage
Store in a well-ventilated place. Keep container tightly closed
Store locked up
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Very toxic to aquatic life with long lasting effects

3. Composition / information on ingredients

Component	CAS-No	Weight %
Pyrene	129-00-0	>95

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Obtain medical attention.

Inhalation Move to fresh air. If breathing is difficult, give oxygen. Obtain medical attention.

Ingestion Do not induce vomiting. Obtain medical attention.

Most important symptoms/effects No information available.
Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Unsuitable Extinguishing Media No information available

Flash Point	210 °C / 410 °F
Method -	No information available
Autoignition Temperature	No information available
Explosion Limits	
Upper	No data available
Lower	No data available
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical
Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products
Carbon monoxide (CO) Carbon dioxide (CO_2)
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health	Flammability	Instability	Physical hazards
2	1	0	N/A

6. Accidental release measures

Personal Precautions	Ensure adequate ventilation. Use personal protective equipment. Avoid dust formation.
Environmental Precautions	Should not be released into the environment. See Section 12 for additional ecological information. Avoid release to the environment. Collect spillage.
Methods for Containment and Clean Up	Sweep up or vacuum up spillage and collect in suitable container for disposal. Avoid dust formation.

7. Handling and storage

Handling	Ensure adequate ventilation. Wear personal protective equipment. Avoid contact with skin, eyes and clothing. Avoid dust formation. Avoid breathing dust/fume/gas/mist/vapours/spray. Avoid ingestion and inhalation.
Storage	Keep containers tightly closed in a dry, cool and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines	This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.
Engineering Measures	Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection	Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin and body protection	Wear appropriate protective gloves and clothing to prevent skin exposure.
Respiratory Protection	Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Solid
Appearance	Yellow
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	148 - 152 °C / 298 - 306 °F
Boiling Point/Range	393 °C / 739.4 °F @ 760 mmHg
Flash Point	210 °C / 410 °F
Evaporation Rate	No information available
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	No information available
Relative Density	No information available
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	C16 H10
Molecular Weight	202.25

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products. Excess heat. Avoid dust formation.

Incompatible Materials Strong oxidizing agents

Hazardous Decomposition Products Carbon monoxide (CO), Carbon dioxide (CO_2)

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information No acute toxicity information is available for this product

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Pyrene	2700 mg/kg (Rat)	Not listed	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Irritating to eyes and skin

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Pyrene	129-00-0	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Central nervous system (CNS)
STOT - repeated exposure Liver

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects Tumorigenic effects have been reported in experimental animals. The toxicological properties have not been fully investigated. See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Do not empty into drains. Do not flush into surface water or sanitary sewer system. Do not allow material to contaminate ground water system.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Pyrene	Not listed	Oncorhynchus mykiss: LC50 > 2mg/L 96h	Not listed	EC50 48h 1.8 mg/L EC50 48h 0.002-0.003 mg/L

Persistence and Degradability No information available
Bioaccumulation/ Accumulation No information available.

Mobility .

Component	log Pow
Pyrene	4.88

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No UN3077
Proper Shipping Name Environmentally hazardous substance, solid, n.o.s
Proper technical name Pyrene
Hazard Class 9
Packing Group III

TDG

UN-No UN3077
Proper Shipping Name Environmentally hazardous substance, solid, n.o.s.
Hazard Class 9
Packing Group III

IATA

UN-No	UN3077
Proper Shipping Name	Environmentally hazardous substance, solid, n.o.s
Hazard Class	9
Packing Group	III

IMDG/IMO

UN-No	UN3077
Proper Shipping Name	Environmentally hazardous substance, solid, n.o.s
Hazard Class	9
Packing Group	III

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Pyrene	X	X	-	204-927-3	-		X	X	X	X	-

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313 Not applicable

SARA 311/312 Hazardous Categorization

Acute Health Hazard	Yes
Chronic Health Hazard	Yes
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Pyrene	-	-	X	X

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Pyrene	5000 lb	5000 lb

California Proposition 65 This product does not contain any Proposition 65 chemicals

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Pyrene	X	X	X	X	-

U.S. Department of Transportation

Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

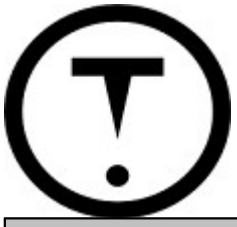
U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class D2B Toxic materials



16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 01-Jul-2010
Revision Date 10-Feb-2015
Print Date 10-Feb-2015
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer
The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS

SAFETY DATA SHEET

Version 6.7
Revision Date 10/27/2023
Print Date 07/13/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : *sec*-Butylbenzene

Product Number : B90408
Brand : Aldrich
CAS-No. : 135-98-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquids (Category 3), H226
Acute toxicity, Oral (Category 4), H302
Short-term (acute) aquatic hazard (Category 1), H400
Long-term (chronic) aquatic hazard (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

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Signal Word	Warning
Hazard statement(s)	
H226	Flammable liquid and vapor.
H302	Harmful if swallowed.
H410	Very toxic to aquatic life with long lasting effects.
Precautionary statement(s)	
P210	Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.
P280	Wear protective gloves/ eye protection/ face protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell. Rinse mouth.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P391	Collect spillage.
P403 + P235	Store in a well-ventilated place. Keep cool.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	2-Phenylbutane
Formula	:	$C_{10}H_{14}$
Molecular weight	:	134.22 g/mol
CAS-No.	:	135-98-8
EC-No.	:	205-227-0

Component	Classification	Concentration
sec-Butylbenzene		
	Flam. Liq. 3; Acute Tox. 4; Aquatic Acute 1; Aquatic Chronic 1; H226, H302, H400, H410 M-Factor - Aquatic Acute: 1	<= 100 %

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For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

In case of eye contact
After eye contact: rinse out with plenty of water. Remove contact lenses.

If swallowed
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Carbon dioxide (CO2) Foam Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

Carbon oxides
Combustible.
Vapors are heavier than air and may spread along floors.
Forms explosive mixtures with air at elevated temperatures.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters

In the event of fire, wear self-contained breathing apparatus.

5.4 Further information

Remove container from danger zone and cool with water. Prevent fire extinguishing water from contaminating surface water or the ground water system.

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SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition.
Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains. Risk of explosion.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on protection against fire and explosion
Keep away from open flames, hot surfaces and sources of ignition.Take precautionary measures against static discharge.

Hygiene measures
Change contaminated clothing. Preventive skin protection recommended. Wash hands after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Keep container tightly closed in a dry and well-ventilated place. Keep away from heat and sources of ignition.

Storage class
Storage class (TRGS 510): 3: Flammable liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters
Contains no substances with occupational exposure limit values.

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8.2 Exposure controls

Appropriate engineering controls

Change contaminated clothing. Preventive skin protection recommended. Wash hands after working with substance.

Personal protective equipment

Eye/face protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the EC approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Flame retardant antistatic protective clothing.

Respiratory protection

Recommended Filter type: Filter type ABEK
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when vapours/aerosols are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure

Do not let product enter drains. Risk of explosion.

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SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid, clear Color: colorless
b)	Odor	No data available
c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 75.5 °C (167.9 °F) - lit.
f)	Initial boiling point and boiling range	173 - 174 °C 343 - 345 °F - lit.
g)	Flash point	52.0 °C (125.6 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Lower explosion limit: 0.8 %(V)
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Density	0.863 g/mL at 25 °C (77 °F) - lit.
	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Autoignition temperature	418.0 °C (784.4 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

No data available

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SECTION 10: Stability and reactivity

10.1 Reactivity
Vapor/air-mixtures are explosive at intense warming.

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
Violent reactions possible with:
Strong oxidizing agents

10.4 Conditions to avoid
Heating.

10.5 Incompatible materials
various plastics

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 1,926 mg/kg
Remarks: (RTECS)
Inhalation: No data available
LD50 Dermal - Rabbit - > 13,760 mg/kg
Remarks: (RTECS)
No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Mild eye irritant - 24 h
Remarks: (RTECS)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Mild eye irritation - 24 h
Remarks: (RTECS)

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is

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identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

RTECS: CY9100000
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

After absorption:

Headache
Nausea
narcosis

Other dangerous properties can not be excluded.

Handle in accordance with good industrial hygiene and safety practice.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to daphnia and other aquatic invertebrates	semi-static test EC50 - Daphnia magna (Water flea) - 0.6 mg/l - 48 h (OECD Test Guideline 202) Remarks: (in analogy to similar products)
Toxicity to algae	static test ErC50 - Pseudokirchneriella subcapitata (green algae) - 0.42 mg/l - 72 h (OECD Test Guideline 201) Remarks: (in analogy to similar products)
	static test NOEC - Pseudokirchneriella subcapitata (green algae) - 0.26 mg/l - 72 h (OECD Test Guideline 201) Remarks: (in analogy to similar products)

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12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties
No data available

12.7 Other adverse effects
Discharge into the environment must be avoided.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)
UN number: 2709 Class: 3 Packing group: III
Proper shipping name: Butyl benzenes
Reportable Quantity (RQ):
Marine pollutant: yes Poison Inhalation Hazard: No

IMDG
UN number: 2709 Class: 3 Packing group: III EMS-No: F-E, S-D
Proper shipping name: BUTYLBENZENES
Marine pollutant : yes
Marine pollutant : yes

IATA
UN number: 2709 Class: 3 Packing group: III
Proper shipping name: Butylbenzenes

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SECTION 15: Regulatory information

SARA 302 Components
This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
sec-Butylbenzene	135-98-8	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
sec-Butylbenzene	135-98-8	1993-04-24

SECTION 16: Other information

Further information
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact misbranding@sial.com.

Version: 6.7 Revision Date: 10/27/2023 Print Date: 07/13/2024

The life science business of Merck KGaA, Darmstadt, Germany
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SAFETY DATA SHEET

Revision Date 10-Feb-2015 **Revision Number** 1

1. Identification

Product Name **Selenium**

Cat No. : **AC419270000; AC419271000; AC419275000**

Synonyms None

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Entity / Business Name
Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute oral toxicity	Category 3
Acute Inhalation Toxicity - Dusts and Mists	Category 3
Specific target organ toxicity - (repeated exposure)	Category 2

Label Elements

Signal Word
Danger

Hazard Statements
Toxic if swallowed
Toxic if inhaled
May cause damage to organs through prolonged or repeated exposure

Precautionary Statements
Prevention

Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Use only outdoors or in a well-ventilated area
Do not breathe dust/fume/gas/mist/vapors/spray

Response

Get medical attention/advice if you feel unwell

Inhalation

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor/physician

Ingestion

IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
Rinse mouth

Storage

Store locked up
Store in a well-ventilated place. Keep container tightly closed

Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

May cause long lasting harmful effects to aquatic life

3. Composition / information on ingredients

Component	CAS-No	Weight %
Selenium	7782-49-2	> 99.5

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.

Skin Contact Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes.

Inhalation Remove from exposure, lie down. Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Immediate medical attention is required.

Ingestion Do not induce vomiting. Never give anything by mouth to an unconscious person. Drink plenty of water. Call a physician immediately. If possible drink milk afterwards.

Most important symptoms/effects No information available.
Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Water spray. Carbon dioxide (CO_2). Dry chemical. chemical foam.

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature No information available
Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical

Vapors may form explosive mixtures with air.

Hazardous Combustion Products
None known
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
3	0	0	N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment.
Environmental Precautions See Section 12 for additional ecological information. Avoid release to the environment. Collect spillage.

Methods for Containment and Clean Up Sweep up or vacuum up spillage and collect in suitable container for disposal.

7. Handling and storage

Handling Avoid contact with skin and eyes. Do not breathe dust. Do not breathe vapors or spray mist. Use only in area provided with appropriate exhaust ventilation.

Storage Keep in a dry, cool and well-ventilated place. Keep container tightly closed. Keep under nitrogen.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH
Selenium	TWA: 0.2 mg/m³	(Vacated) TWA: 0.2 mg/m³	IDLH: 1 mg/m³ TWA: 0.2 mg/m³

Component	Quebec	Mexico OEL (TWA)	Ontario TWAEV
Selenium	TWA: 0.2 mg/m³	TWA: 0.2 mg/m³	TWA: 0.2 mg/m³

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health

Engineering Measures Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection A NIOSH/MSHA approved air purifying dust or mist respirator or European Standard EN 149.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Powder Solid
Appearance	Grey
Odor	No information available
Odor Threshold	No information available
pH	No information available
Melting Point/Range	217 - 222 °C / 422.6 - 431.6 °F
Boiling Point/Range	685 °C / 1265 °F
Flash Point	No information available
Evaporation Rate	No information available
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	1 mmHg @ 345 °C
Vapor Density	No information available
Relative Density	4.810
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	Se
Molecular Weight	78.96

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products.

Incompatible Materials Acids, Strong oxidizing agents, Fluorine, oxygen, Metals

Hazardous Decomposition Products None under normal use conditions

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information No acute toxicity information is available for this product

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Selenium	6700 mg/kg (Rat)	Not listed	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Selenium	7782-49-2	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known
STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available
Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity
Do not empty into drains.

Persistence and Degradability No information available
Bioaccumulation/ Accumulation No information available.

Mobility No information available.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT
- **UN-No** UN3283
- **Hazard Class** 6.1
- **Packing Group** III

TDG
- **UN-No** UN3283
- **Hazard Class** 6.1
- **Packing Group** III

IATA
- **UN-No** 3283
- **Proper Shipping Name** SELENIUM COMPOUND, SOLID, N.O.S.
- **Hazard Class** 6.1
- **Packing Group** III

IMDG/IMO
- **UN-No** 3283
- **Proper Shipping Name** SELENIUM COMPOUND, SOLID, N.O.S.
- **Hazard Class** 6.1
- **Packing Group** III

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Selenium	X	X	-	231-957-4	-		X	-	X	X	X

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Selenium	7782-49-2	> 99.5	1.0

SARA 311/312 Hazardous Categorization

Acute Health Hazard	Yes
Chronic Health Hazard	Yes
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Selenium	-	-	X	X

Clean Air Act Not applicable

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Selenium	X		-

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Selenium	100 lb	-

California Proposition 65 This product does not contain any Proposition 65 chemicals

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Selenium	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class D1A Very toxic materials
D2B Toxic materials

16. Other information

Prepared By Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Revision Date 10-Feb-2015
Print Date 10-Feb-2015
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer
The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS

SAFETY DATA SHEET

Version 4.11
Revision Date 03/05/2015
Print Date 02/07/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Sodium

Product Number : 483745
Brand : Aldrich

CAS-No. : 7440-23-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Substances and mixtures, which in contact with water, emit flammable gases (Category 1), H260
Skin corrosion (Category 1B), H314
Serious eye damage (Category 1), H318
Carcinogenicity (Category 1A), H350

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H260	In contact with water releases flammable gases which may ignite spontaneously.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H350	May cause cancer.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P223	Keep away from any possible contact with water, because of violent reaction and possible flash fire.

P231 + P232	Handle under inert gas. Protect from moisture.
P260	Do not breathe dust or mist.
P264	Wash skin thoroughly after handling.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P281	Use personal protective equipment as required.
P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P310	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/ physician.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/ physician.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P335 + P334	Brush off loose particles from skin. Immerse in cool water/ wrap in wet bandages.
P363	Wash contaminated clothing before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P402 + P404	Store in a dry place. Store in a closed container.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Reacts violently with water.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.2 Mixtures

Formula : Na
Molecular weight : 22.99 g/mol

Hazardous components

Component		Classification	Concentration
Sodium			
CAS-No. EC-No. Index-No.	7440-23-5 231-132-9 011-001-00-0	Water-react. 1; Skin Corr. 1B; Eye Dam. 1; H260, H314	>= 90 - <= 100 %
Paraffin oils			
CAS-No. EC-No.	8012-95-1 232-384-2	Carc. 1A; H350	>= 90 - <= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.Continue rinsing eyes during transport to hospital.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Dry powder

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Do not flush with water. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid formation of dust and aerosols.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.Keep away from sources of ignition - No smoking.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.
Never allow product to get in contact with water during storage.

Handle and store under inert gas. Air sensitive.
Storage class (TRGS 510): Hazardous materials, which set free flammable gases upon contact with water

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Paraffin oils	8012-95-1	STEL	10.000000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		TWA	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	5.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	10.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	5.000000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Upper Respiratory Tract irritation 2014 Adoption Not classifiable as a human carcinogen		
		Upper Respiratory Tract irritation 2014 Adoption Exposure by all routes should be carefully controlled to levels as low as possible. Suspected human carcinogen		
		TWA	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Upper Respiratory Tract irritation Exposure by all routes should be carefully controlled to levels as low as possible. Suspected human carcinogen		
		TWA	5.000000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Upper Respiratory Tract irritation Not classifiable as a human carcinogen		
		TWA	5.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	10.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Upper Respiratory Tract irritation Exposure by all routes should be carefully controlled to levels as low as possible. Suspected human carcinogen		

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: Pieces
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 97.8 °C (208.0 °F) - lit.
f)	Initial boiling point and boiling range	883 °C (1,621 °F) - lit.
g)	Flash point	82 °C (180 °F)
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	0.97 g/cm3

n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Reacts violently with water.

10.4 Conditions to avoid
Air Do not allow water to enter container.
Exposure to moisture

10.5 Incompatible materials
Oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: 1 - Group 1: Carcinogenic to humans (Paraffin oils)

NTP: Known to be human carcinogenThe reference note has been added by TD based on the background information of the NTP. (Paraffin oils)

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: Not available

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., Aspiration may lead to:, lipid pneumonia, Effects due to ingestion may include:, laxative effect, Gastrointestinal disturbance, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1428 Class: 4.3 Packing group: I
Proper shipping name: Sodium
Reportable Quantity (RQ): 10 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 1428 Class: 4.3 Packing group: I EMS-No: F-G, S-N
Proper shipping name: SODIUM

IATA
UN number: 1428 Class: 4.3 Packing group: I
Proper shipping name: Sodium
IATA Passenger: Not permitted for transport

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Reactivity Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Sodium	7440-23-5	1993-04-24
Paraffin oils	8012-95-1	2007-03-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Sodium	7440-23-5	1993-04-24
Paraffin oils	8012-95-1	2007-03-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Sodium	7440-23-5	1993-04-24
Paraffin oils	8012-95-1	2007-03-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No.	Revision Date
Paraffin oils	8012-95-1	1987-02-27

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Carc.	Carcinogenicity
Eye Dam.	Serious eye damage
H260	In contact with water releases flammable gases which may ignite spontaneously.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H350	May cause cancer.
Skin Corr.	Skin corrosion
Water-react.	Substances and mixtures, which in contact with water, emit flammable gases

HMIS Rating

Health hazard:	3
Chronic Health Hazard:	*
Flammability:	4
Physical Hazard	2

NFPA Rating

Health hazard:	3
Fire Hazard:	4
Reactivity Hazard:	2
Special hazard.I:	W

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.11 Revision Date: 03/05/2015 Print Date: 02/07/2016

SAFETY DATA SHEET

Version 3.14
Revision Date 12/02/2015
Print Date 02/18/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Styrene

Product Number : 240869
Brand : Aldrich
Index-No. : 601-026-00-0

CAS-No. : 100-42-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 3), H226
Acute toxicity, Inhalation (Category 4), H332
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Carcinogenicity (Category 2), H351
Reproductive toxicity (Category 2), H361
Specific target organ toxicity - repeated exposure (Category 1), H372
Acute aquatic toxicity (Category 2), H401

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H226 Flammable liquid and vapour.
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H332 Harmful if inhaled.
H351 Suspected of causing cancer.
H361 Suspected of damaging fertility or the unborn child.

H372	Causes damage to organs through prolonged or repeated exposure.
H401	Toxic to aquatic life.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P210	Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Lachrymator.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	Phenylethylene Vinylbenzene
Formula	:	$C_8H_8C_8H_8$
Molecular weight	:	104.15 g/mol
CAS-No.	:	100-42-5
EC-No.	:	202-851-5
Index-No.	:	601-026-00-0

Hazardous components

Component	Classification	Concentration
Styrene		
	Flam. Liq. 3; Acute Tox. 4; Skin Irrit. 2; Eye Irrit. 2A; Carc. 2; Repr. 2; STOT RE 1; Aquatic Acute 2; H226, H315, H319, H332, H351, H361, H372, H401	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides
Container explosion may occur under fire conditions., Vapours may form explosive mixture with air.

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Recommended storage temperature 2 - 8 °C

Light sensitive.
Storage class (TRGS 510): Flammable liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Styrene	100-42-5	TWA	50.000000 ppm 215.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	100.000000 ppm 425.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
	Remarks	See Table Z-2		
		TWA	100.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.15-1969		
		CEIL	200.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.15-1969		
		Peak	600.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.15-1969		
		TWA	20.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Peripheral neuropathy Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		STEL	40.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Peripheral neuropathy Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		TWA	100 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.15-1969		

		CEIL	200 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.15-1969		
		Peak	600 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.15-1969		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Styrene	100-42-5	Mandelic acid plus phenylglyoxylic acid	400mg/g Creatinine	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift (As soon as possible after exposure ceases)			
		Styrene	0.2000 mg/l	In venous blood	ACGIH - Biological Exposure Indices (BEI)
		End of shift (As soon as possible after exposure ceases)			
		Mandelic acid plus phenylglyoxylic acid	400mg/g Creatinine	Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift (As soon as possible after exposure ceases)			
		Styrene	40 µg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift (As soon as possible after exposure ceases)			

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 32 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid, clear Colour: colourless
b)	Odour	sweet
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -31 °C (-24 °F) - lit.
f)	Initial boiling point and boiling range	145 - 146 °C (293 - 295 °F) - lit.
g)	Flash point	32.0 °C (89.6 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 8.9 %(V) Lower explosion limit: 1.1 %(V)
k)	Vapour pressure	6 hPa (5 mmHg) at 20 °C (68 °F)
l)	Vapour density	3.6
m)	Relative density	0.906 g/cm3 at 25 °C (77 °F)
n)	Water solubility	0.05 g/l at 25 °C (77 °F) - slightly soluble
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	490.0 °C (914.0 °F) 480.0 °C (896.0 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Relative vapour density	3.6

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.
Test for peroxide formation before distillation or evaporation. Test for peroxide formation or discard after 1 year.
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Vapours may form explosive mixture with air.Vapours may form explosive mixture with air.

10.4 Conditions to avoid
May polymerize on exposure to light.
Heat, flames and sparks.

10.5 Incompatible materials
Oxidizing agents, Copper

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - > 6,000 mg/kg

LC50 Inhalation - Rat - 4 h - 12,000 mg/m3

LD50 Dermal - Rat - male and female - > 2,000 mg/kg

No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Skin irritation
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Eye irritation - 24 h

Respiratory or skin sensitisation
Maximisation Test (GPMT) - Guinea pig
Does not cause skin sensitisation.
(OECD Test Guideline 406)

Germ cell mutagenicity
Laboratory experiments have shown mutagenic effects.

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

IARC:	2B - Group 2B: Possibly carcinogenic to humans (Styrene)
NTP:	Reasonably anticipated to be a human carcinogen (Styrene)
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
Suspected of damaging the unborn child. Suspected human reproductive toxicant

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard
No data available

Additional Information
RTECS: WL3675000

Dermatitis, Central nervous system depression, Nausea, Dizziness, Headache, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Endocrine system. -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	NOEC - Pimephales promelas (fathead minnow) - 4 mg/l - 96 h
	LC50 - Pimephales promelas (fathead minnow) - 32 mg/l - 96 h
	LOEC - Pimephales promelas (fathead minnow) - 7.6 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 4.7 mg/l - 48 h (OECD Test Guideline 202)
Toxicity to algae	IC50 - Pseudokirchneriella subcapitata (green algae) - 1.4 mg/l - 72 h

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 28 d Result: > 60 % - Readily biodegradable

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Toxic to aquatic life.

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 2055 Class: 3 Packing group: III
Proper shipping name: Styrene monomer, stabilized
Reportable Quantity (RQ): 1000 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 2055 Class: 3 Packing group: III EMS-No: F-E, S-D
Proper shipping name: STYRENE MONOMER, STABILIZED

IATA
UN number: 2055 Class: 3 Packing group: III
Proper shipping name: Styrene monomer, stabilized

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Styrene	100-42-5	2007-07-01

SARA 311/312 Hazards
Fire Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Styrene	100-42-5	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Styrene	100-42-5	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Styrene	100-42-5	2007-07-01

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Carc.	Carcinogenicity
Eye Irrit.	Eye irritation
Flam. Liq.	Flammable liquids
H226	Flammable liquid and vapour.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H351	Suspected of causing cancer.
H361	Suspected of damaging fertility or the unborn child.
H372	Causes damage to organs through prolonged or repeated exposure.
H401	Toxic to aquatic life.

HMIS Rating

Health hazard:	1
Chronic Health Hazard:	*
Flammability:	3
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	3
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 3.14 Revision Date: 12/02/2015 Print Date: 02/18/2016

SAFETY DATA SHEET

Version 6.12
Revision Date 09/07/2024
Print Date 09/08/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : *tert*-Butanol

Product Number : 471712
Brand : Sigma-Aldrich
Index-No. : 603-005-00-1
CAS-No. : 75-65-0

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquids (Category 2), H225
Acute toxicity, Inhalation (Category 4), H332
Eye irritation (Category 2A), H319

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Specific target organ toxicity - single exposure (Category 3), Respiratory system, Central nervous system, H335, H336

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal Word Danger

Hazard Statements

H225	Highly flammable liquid and vapor.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H335	May cause respiratory irritation.
H336	May cause drowsiness or dizziness.

Precautionary Statements

P210	Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P261	Avoid breathing mist or vapors.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/ eye protection/ face protection.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms : 2-Methyl-2-propanol

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Trimethyl carbinol
tert-Butyl alcohol

Formula	:	$C_4H_{10}O$
Molecular weight	:	74.12 g/mol
CAS-No.	:	75-65-0
EC-No.	:	200-889-7
Index-No.	:	603-005-00-1

Component	Classification	Concentration
tert-Butanol		
	Flam. Liq. 2; Acute Tox. 4; Eye Irrit. 2A; STOT SE 3; H225, H332, H319, H335, H336 Concentration limits: 20 %: STOT SE 3, H335;	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Immediately call in physician. If breathing stops: immediately apply artificial respiration, if necessary also oxygen.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

In case of eye contact
After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

If swallowed
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

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SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Carbon dioxide (CO2) Foam Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

Carbon oxides
Flash back possible over considerable distance.
Combustible.
Pay attention to flashback.
Vapors are heavier than air and may spread along floors.
Development of hazardous combustion gases or vapours possible in the event of fire.
Forms explosive mixtures with air at ambient temperatures.

5.3 Advice for firefighters

In the event of fire, wear self-contained breathing apparatus.

5.4 Further information

In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion.Remove container from danger zone and cool with water. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition.
Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains. Risk of explosion.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up with liquid-absorbent material (e.g. Chemizorb®).
Dispose of properly. Clean up affected area.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

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Advice on protection against fire and explosion
Keep away from open flames, hot surfaces and sources of ignition.Take precautionary measures against static discharge.

Hygiene measures
Change contaminated clothing. Preventive skin protection recommended. Wash hands after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Keep container tightly closed in a dry and well-ventilated place. Keep away from heat and sources of ignition.

Storage class
Storage class (TRGS 510): 3: Flammable liquids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
tert-Butanol	75-65-0	TWA	100 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Not classifiable as a human carcinogen		
		TWA	100 ppm 300 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	150 ppm 450 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	100 ppm 300 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		STEL	150 ppm 450 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		PEL	100 ppm 300 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

8.2 Exposure controls

Appropriate engineering controls
Change contaminated clothing. Preventive skin protection recommended. Wash hands after working with substance.

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Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 480 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Splash contact
Material: Chloroprene
Minimum layer thickness: 0.65 mm
Break through time: 240 min
Material tested:KCL 720 Camapren®

Body Protection
Flame retardant antistatic protective clothing.

Respiratory protection
Recommended Filter type: Filter A (acc. to DIN 3181) for vapours of organic compounds
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when vapours/aerosols are generated. Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains. Risk of explosion.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid
b)	Odor	camphor-like
c)	Odor Threshold	ca.71 ppm

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d)	pH	at 20 °C (68 °F)neutral
e)	Melting point/freezing point	Melting point/ range: 23 - 26 °C (73 - 79 °F)
f)	Initial boiling point and boiling range	83 °C 181 °F
g)	Flash point	15 °C (59 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 8.0 %(V) Lower explosion limit: 2.3 %(V)
k)	Vapor pressure	40.7 hPa at 20 °C (68 °F)
l)	Vapor density	2.56
m)	Density	0.775 g/mL at 25 °C (77 °F)
	Relative density	No data available
n)	Water solubility	soluble
o)	Partition coefficient: n-octanol/water	log Pow: 0.30 - Bioaccumulation is not expected.
p)	Autoignition temperature	470 °C (878 °F) at 1,013 hPa - see user defined free text
q)	Decomposition temperature	No data available
r)	Viscosity	5.72 mm2/s at 25 °C (77 °F) - OECD Test Guideline 114 - 2.23 mm2/s at 45 °C (113 °F) - OECD Test Guideline 114 -
s)	Explosive properties	No data available
t)	Oxidizing properties	none

9.2 Other safety information

Surface tension	69.8 mN/m at 1.09g/l at 21 °C (70 °F) - OECD Test Guideline 115
Dissociation constant	19.2 at 20 °C (68 °F)
Relative vapor density	2.56

SECTION 10: Stability and reactivity

10.1 Reactivity

Vapors may form explosive mixture with air.

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10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
Violent reactions possible with:
Alkali metals
Alkaline earth metals
Strong acids
Aluminum
Strong oxidizing agents

10.4 Conditions to avoid
Warming.

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - male and female - 3,046 mg/kg
(US-EPA)
Acute toxicity estimate Inhalation - 4 h - 11.1 mg/l - vapor

(Expert judgment)
Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)
LD50 Dermal - Rabbit - male and female - > 2,000 mg/kg
(US-EPA)

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation - 24 h
(Draize Test)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Causes serious eye irritation.
(US-EPA)

Respiratory or skin sensitization
Maximization Test - Guinea pig
Result: negative
(OECD Test Guideline 406)

Germ cell mutagenicity
Test Type: In vitro mammalian cell gene mutation test
Test system: Mouse lymphoma test
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476

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Result: negative
Test Type: Chromosome aberration test in vitro
Test system: Chinese hamster ovary cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 473
Result: negative
Test Type: Ames test
Test system: Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative
Test Type: sister chromatid exchange assay
Test system: Chinese hamster ovary cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 479
Result: negative

Test Type: Micronucleus test
Species: Mouse
Cell type: Red blood cells (erythrocytes)
Application Route: Oral
Method: OECD Test Guideline 474
Result: negative

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
Inhalation - May cause respiratory irritation. - Respiratory system
Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)
Inhalation - May cause drowsiness or dizziness. - Nervous system

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

RTECS: EO1925000
drying, cracking of the skin, Skin irritation
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Liver - Irregularities - Based on Human Evidence

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Liver - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	flow-through test LC50 - Pimephales promelas (fathead minnow) - > 961 mg/l - 96 h (OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	static test EC50 - Daphnia magna (Water flea) - 933 mg/l - 48 h (Directive 67/548/EEC, Annex V, C.2.)
Toxicity to algae	static test ErC50 - Pseudokirchneriella subcapitata (green algae) - > 976 mg/l - 72 h (OECD Test Guideline 201)
Toxicity to bacteria	static test EC50 - Pseudomonas putida - > 10,000 mg/l - 16 h (DIN 38 412 Part 8)
	static test EC10 - Pseudomonas putida - 6,900 mg/l - 16 h (DIN 38 412 Part 8)
Toxicity to daphnia and other aquatic invertebrates(Chronic toxicity)	semi-static test EC50 - Daphnia magna (Water flea) - > 100 mg/l - 21 d (OECD Test Guideline 211)
	semi-static test NOEC - Daphnia magna (Water flea) - 100 mg/l - 21 d (OECD Test Guideline 211)

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 56 d Result: 66 % - Inherently biodegradable. Remarks: (ECHA)

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties

No data available

12.7 Other adverse effects

No data available

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SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)
UN number: 1120 Class: 3 Packing group: II
Proper shipping name: Butanols
Reportable Quantity (RQ):
Poison Inhalation Hazard: No

IMDG
UN number: 1120 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: BUTANOLS

IATA
UN number: 1120 Class: 3 Packing group: II
Proper shipping name: Butanols

SECTION 15: Regulatory information

CERCLA Reportable Quantity
This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity
This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity
This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Fire Hazard
Acute Health Hazard
Chronic Health Hazard

SARA 313 : The following components are subject to reporting levels established by SARA Title III, Section 313:

tert-Butanol	75-65-0	>= 90 - <= 100 %

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US State Regulations

Massachusetts Right To Know

tert-Butanol	75-65-0

Pennsylvania Right To Know

tert-Butanol	75-65-0

Maine Chemicals of High Concern

Product does not contain any listed chemicals

Vermont Chemicals of High Concern

Product does not contain any listed chemicals

Washington Chemicals of High Concern

Product does not contain any listed chemicals

The ingredients of this product are reported in the following inventories:

TSCA : All substances listed as active on the TSCA inventory

TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.12 Revision Date: 09/07/2024 Print Date: 09/08/2024

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SAFETY DATA SHEET

Version 8.6
Revision Date 02/07/2023
Print Date 02/15/2023

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Tetrachloroethylene

Product Number : 371696
Brand : Sigma-Aldrich
Index-No. : 602-028-00-4
CAS-No. : 127-18-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Skin sensitization (Category 1), H317
Carcinogenicity (Category 2), H351
Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336
Short-term (acute) aquatic hazard (Category 2), H401
Long-term (chronic) aquatic hazard (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

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Pictogram	
Signal Word	Warning

Hazard statement(s)

H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H336	May cause drowsiness or dizziness.
H351	Suspected of causing cancer.
H411	Toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P261	Avoid breathing mist or vapors.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P272	Contaminated work clothing must not be allowed out of the workplace.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P333 + P313	If skin irritation or rash occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Perchloroethylene PCE
Formula	:	C_2Cl_4
Molecular weight	:	165.83 g/mol
CAS-No.	:	127-18-4
EC-No.	:	204-825-9
Index-No.	:	602-028-00-4

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Component	Classification	Concentration
Tetrachlorethylene		
	Skin Irrit. 2; Eye Irrit. 2A; Skin Sens. 1; Carc. 2; STOT SE 3; Aquatic Acute 2; Aquatic Chronic 2; H315, H319, H317, H351, H336, H401, H411 Concentration limits: >= 20 %: STOT SE 3, H336;	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Call in physician.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

In case of eye contact
After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

If swallowed
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Water Foam Carbon dioxide (CO2) Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

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5.2 Special hazards arising from the substance or mixture

Carbon oxides
Hydrogen chloride gas
Combustible.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information

Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

Hygiene measures
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.

Storage class
Storage class (TRGS 510): 6.1C: Combustible, acute toxic Cat.3 / toxic compounds or compounds which causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

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SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Tetrachlorethylene	127-18-4	TWA	25 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Confirmed animal carcinogen with unknown relevance to humans		
		STEL	100 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Confirmed animal carcinogen with unknown relevance to humans		
		Potential Occupational Carcinogen		
		TWA	100 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		CEIL	200 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Peak	300 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		TWA	25 ppm 170 mg/m3	USA. Table Z-1-A Limits for Air Contaminants (1989 vacated values)
		PEL	25 ppm 170 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		STEL	100 ppm 685 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		C	300 ppm	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Tetrachlorethylene	127-18-4	Tetrachloroethylene	3parts per million	In end-exhaled air	ACGIH - Biological Exposure Indices (BEI)
	Remarks	Prior to shift (16 hours after exposure ceases)			
		Tetrachloroethylene	0.5 mg/l	In blood	ACGIH - Biological Exposure Indices (BEI)
		Prior to shift (16 hours after exposure ceases)			

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8.2 Exposure controls

Appropriate engineering controls
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Full contact
Material: Viton®
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 240 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

Body Protection
protective clothing

Respiratory protection
required when vapours/aerosols are generated. Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid, clear Color: colorless
b)	Odor	No data available
c)	Odor Threshold	No data available
d)	pH	No data available

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e)	Melting point/freezing point	Melting point/range: -22 °C (-8 °F) - lit.
f)	Initial boiling point and boiling range	121 °C 250 °F - lit.
g)	Flash point	()No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	25.3 hPa at 25.0 °C (77.0 °F) 17.3 hPa at 20.0 °C(68.0 °F)
l)	Vapor density	No data available
m)	Density	1.623 g/cm3 at 25 °C (77 °F) - lit.
	Relative density	No data available
n)	Water solubility	0.15 g/l at 25 °C (77 °F)
o)	Partition coefficient: n-octanol/water	log Pow: 2.53 at 23 °C (73 °F) - Bioaccumulation is not expected.
p)	Autoignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Surface tension	32.1 mN/m at 20 °C (68 °F)

SECTION 10: Stability and reactivity

10.1 Reactivity

No data available

10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions

Risk of explosion with:
Alkali metals
Aluminum
sodium amide
Barium
nitrogen dioxide
Oxygen

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with
alkali hydroxides
Exothermic reaction with:
strong alkalis
Alkaline earth metals
strong alkalis
Light metals
Powdered metals
Oxidizing agents
Strong acids
Strong bases
nitrous gases
Risk of ignition or formation of inflammable gases or vapours with:
zinc oxide
with
Aluminum

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
various plastics

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - male and female - 3,420 mg/kg
(OECD Test Guideline 401)
Remarks: (ECHA)
Inhalation: No data available
Dermal: No data available
No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Skin irritation - 4 h
(OECD Test Guideline 404)
Remarks: (ECHA)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Mild eye irritation - 24 h
(Draize Test)
Remarks: (RTECS)

Respiratory or skin sensitization
Local lymph node assay (LLNA) - Mouse
Result: May cause sensitization by skin contact.
(OECD Test Guideline 429)
Remarks: (ECHA)

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Germ cell mutagenicity
Test Type: Chromosome aberration test in vitro
Test system: Chinese hamster ovary cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 473
Result: negative
Remarks: (ECHA)
Test Type: Ames test
Test system: Salmonella typhimurium
Metabolic activation: without metabolic activation
Method: OECD Test Guideline 471
Result: negative
Remarks: (ECHA)

Test Type: Micronucleus test
Species: Mouse

Application Route: Intraperitoneal
Method: OECD Test Guideline 474
Result: negative
Remarks: (ECHA)

Carcinogenicity
Suspected of causing cancer.

IARC:	2A - Group 2A: Probably carcinogenic to humans (Tetrachlorethylene)
NTP:	RAHC - Reasonably anticipated to be a human carcinogen (Tetrachlorethylene)
OSHA:	No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
May cause drowsiness or dizziness.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

Repeated dose toxicity - Mouse - female - Oral - LOAEL (Lowest observed adverse effect level) - 390 mg/kg

RTECS: KX3850000
narcosis, Liver injury may occur., Kidney injury may occur.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	flow-through test LC50 - Oncorhynchus mykiss (rainbow trout) - 5 mg/l - 96 h

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Remarks: (ECHA)

Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 7.50 mg/l - 48 h
Toxicity to algae	ErC50 - Chlamydomonas reinhardtii (green algae) - 3.64 mg/l - 72 h Remarks: (ECHA)
Toxicity to fish(Chronic toxicity)	flow-through test NOEC - Jordanella floridae - 1.99 mg/l - 10 d Remarks: (ECHA)
Toxicity to daphnia and other aquatic invertebrates(Chronic toxicity)	semi-static test NOEC - Daphnia magna (Water flea) - 0.51 mg/l - 28 d Remarks: (ECHA)

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 28 d Result: 11 % - Not readily biodegradable. (OECD Test Guideline 301C)

12.3 Bioaccumulative potential

Bioaccumulation	Lepomis macrochirus (Bluegill) - 21 d - 0.00343 mg/l(Tetrachlorethylene) Bioconcentration factor (BCF): 49

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties

No data available

12.7 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)

UN number: 1897 Class: 6.1 Packing group: III

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Proper shipping name: Tetrachloroethylene
Reportable Quantity (RQ): 100 lbs
Reportable Quantity (RQ): 100 lbs
Reportable Quantity (RQ): 10 lbs
Reportable Quantity (RQ): 10 lbs
Poison Inhalation Hazard: No

IMDG
UN number: 1897 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: TETRACHLOROETHYLENE
Marine pollutant : yes

IATA
UN number: 1897 Class: 6.1 Packing group: III
Proper shipping name: Tetrachloroethylene

SECTION 15: Regulatory information

SARA 302 Components
This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Tetrachlorethylene	127-18-4	2020-07-14

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Reportable Quantity : D039 lbs
F001 lbs
F002 lbs

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Tetrachlorethylene	127-18-4	2020-07-14

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Tetrachlorethylene	127-18-4	2020-07-14

California Prop. 65 Components

	CAS-No.	Revision Date
, which is/are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.Tetrachlorethylene	127-18-4	2017-04-11

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SECTION 16: Other information

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 8.6 Revision Date: 02/07/2023 Print Date: 02/15/2023

The life science business of Merck KGaA, Darmstadt, Germany
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SAFETY DATA SHEET

Version 4.11
Revision Date 10/29/2015
Print Date 03/03/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Tetrahydrofuran

Product Number : 401757
Brand : Sigma-Aldrich
Index-No. : 603-025-00-0

CAS-No. : 109-99-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 2), H225
Acute toxicity, Oral (Category 4), H302
Eye irritation (Category 2A), H319
Carcinogenicity (Category 2), H351
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H225 Highly flammable liquid and vapour.
H302 Harmful if swallowed.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.
H351 Suspected of causing cancer.

Precautionary statement(s)
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and

	understood.
P210	Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell. Rinse mouth.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

May form explosive peroxides.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	THF
Formula	:	C_4H_8O
Molecular weight	:	72.11 g/mol
CAS-No.	:	109-99-9
EC-No.	:	203-726-8
Index-No.	:	603-025-00-0
Registration number	:	01-2119444314-46-XXXX

Hazardous components

Component	Classification	Concentration
Tetrahydrofuran		
	Flam. Liq. 2; Acute Tox. 4; Eye Irrit. 2A; Carc. 2; STOT SE 3; H225, H302, H319, H335, H351	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Use explosion-proof equipment.Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Dry residue is explosive. Store under inert gas. Test for peroxide formation periodically and before distillation.
Storage class (TRGS 510): Flammable liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Tetrahydrofuran	109-99-9	TWA	50.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Central Nervous System impairment Upper Respiratory Tract irritation Kidney damage Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption		
		STEL	100.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Kidney damage Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption		
		TWA	200.000000 ppm 590.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	250.000000 ppm 735.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	200.000000 ppm 590.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Tetrahydrofuran	109-99-9	Tetrahydrofuran	2.0000 mg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift (As soon as possible after exposure ceases)			

Derived No Effect Level (DNEL)

Application Area	Exposure routes	Health effect	Value
Workers	Skin contact	Long-term systemic effects	25mg/kg BW/d
Consumers	Skin contact	Long-term systemic effects	15mg/kg BW/d
Workers	Inhalation	Long-term local effects	150 mg/m3
Workers	Inhalation	Long-term systemic effects	150 mg/m3
Consumers	Inhalation	Long-term systemic effects	62 mg/m3
Consumers	Inhalation	Acute local effects	150 mg/m3
Consumers	Inhalation	Acute systemic effects	150 mg/m3

Predicted No Effect Concentration (PNEC)

Compartment	Value
Soil	2.13 mg/kg
Marine water	0.432 mg/l
Fresh water	4.32 mg/l
Marine sediment	2.33 mg/kg
Fresh water sediment	23.3 mg/kg
Onsite sewage treatment plant	4.6 mg/l

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Splash contact
Material: butyl-rubber
Minimum layer thickness: 0.3 mm
Break through time: 18 min
Material tested:Butoject® (KCL 897 / Aldrich Z677647, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid, clear Colour: colourless
b)	Odour	ether-like
c)	Odour Threshold	No data available
d)	pH	ca.7
e)	Melting point/freezing	Melting point/range: -108.44 °C (-163.19 °F) at 1,013.25 hPa (760.00

	point	mmHg)
f)	Initial boiling point and boiling range	65.0 - 67.0 °C (149.0 - 152.6 °F) at 1,013.25 hPa (760.00 mmHg)
g)	Flash point	-17.0 °C (1.4 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 11.8 %(V) Lower explosion limit: 1.8 %(V)
k)	Vapour pressure	170 hPa (128 mmHg) at 20.0 °C (68.0 °F)
l)	Vapour density	ca.2.5 at 25 °C (77 °F) - (Air = 1.0)
m)	Relative density	0.89 g/cm3
n)	Water solubility	soluble
o)	Partition coefficient: n-octanol/water	log Pow: 0.46
p)	Auto-ignition temperature	215 °C (419 °F) at 1,013 hPa (760 mmHg)
q)	Decomposition temperature	No data available
r)	Viscosity	0.518 mm2/s at 25 °C (77 °F) - 0.403 mm2/s at 50 °C (122 °F) -
s)	Explosive properties	Not explosive, In use may form flammable/explosive vapour-air mixture.
t)	Oxidizing properties	The substance or mixture is not classified as oxidizing.

9.2 Other safety information

Relative vapour density	ca.2.5 at 25 °C (77 °F) - (Air = 1.0)

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.
Test for peroxide formation before distillation or evaporation. Test for peroxide formation or discard after 1 year.

10.3 Possibility of hazardous reactions
Vapours may form explosive mixture with air.

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Strong oxidizing agents, Acids

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 1,650 mg/kg

LC50 Inhalation - Rat - 6 h - 14.7 mg/l
Remarks: Material may be irritating to mucous membranes and upper respiratory tract.

LD50 Dermal - Rat - > 2,000 mg/kg

No data available

Skin corrosion/irritation
Based on available data, the classification criteria are not met.

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Risk of serious damage to eyes.
(Draize Test)

Respiratory or skin sensitisation
Based on available data, the classification criteria are not met.

Germ cell mutagenicity
In vivo tests did not show mutagenic effects

Ames test
S. typhimurium
Result: negative

Carcinogenicity

Suspected human carcinogens

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No toxicity to reproduction

Specific target organ toxicity - single exposure
May cause drowsiness or dizziness. - Nervous system
May cause respiratory irritation.

Specific target organ toxicity - repeated exposure
The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Aspiration hazard
No aspiration toxicity classification

Additional Information
RTECS: LU5950000

Central nervous system depression, Cough, chest pain, Difficulty in breathing, Exposure to high airborne concentrations can cause anesthetic effects.

Stomach - Irregularities - Based on Human Evidence
Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - 2,160 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 382 mg/l - 24 h
Toxicity to algae	Growth inhibition IC50 - Algae - 3,700 mg/l - 192 h

12.2 Persistence and degradability

Biodegradability

(OECD Test Guideline 301)

Remarks: According to the results of tests of biodegradability this product is not readily biodegradable.

12.3 Bioaccumulative potential

No bioaccumulation is to be expected (log Pow <= 4).

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 2056 Class: 3 Packing group: II

Proper shipping name: Tetrahydrofuran

Reportable Quantity (RQ): 1000 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 2056 Class: 3 Packing group: II EMS-No: F-E, S-D

Proper shipping name: TETRAHYDROFURAN

IATA

UN number: 2056 Class: 3 Packing group: II

Proper shipping name: Tetrahydrofuran

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Tetrahydrofuran	109-99-9	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Tetrahydrofuran	109-99-9	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Tetrahydrofuran	109-99-9	1993-04-24

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Carc.	Carcinogenicity
Eye Irrit.	Eye irritation
Flam. Liq.	Flammable liquids
H225	Highly flammable liquid and vapour.
H302	Harmful if swallowed.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H351	Suspected of causing cancer.
STOT SE	Specific target organ toxicity - single exposure

HMIS Rating

Health hazard:	1
Chronic Health Hazard:	*
Flammability:	3
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	3
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.11 Revision Date: 10/29/2015 Print Date: 03/03/2016

Safety Data Sheets (SDS)

SECTION 1-IDENTIFICATION

Product name: Toluene

Other names:-

Proper shipping name: Toluene

Recommended use of the chemical and restrictions on use:
The major use of toluene is as a mixture added to gasoline to improve octane ratings. Used as a solvent for paint, resins, lacquers inks & adhesives. Component of solvent blends and thinners. Used in the manufacture of chemicals, dyes, explosives, benzoic acid. Some grades of toluene may contain traces of xylene and benzene.
The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing. Before starting consider control of exposure by mechanical ventilation.
WARNING: Intentional misuse by concentrating/inhaling contents may be lethal.

Manufacturer/Supplier Name: Taiwan SM Corp., Kaohsiung plant
Address: NO.7, Industrial 1st Rd, Lin-Yuan Kaohsiung County 83203, Taiwan, R.O.C.
Phone No.: 886-7-6414511

Emergency phone No./Fax No.: 886-7-6414511 Ext. 221 (on duty), 886-7-6414517 (off duty)/886-7-6423828

SECTION 2-HAZARDS IDENTIFICATION

GHS Classification:

Flammable Liquid Category 2
Acute Toxicity (Oral) Category 4
Skin Corrosion/ Irritation Category 2
Serious Eye Damage/ Eye Irritation Category 2
Specific Target Organ Toxicity Repeated Exposure Category 2
Hazardous To The Aquatic Environment (Acute) Category 3
Aspiration Hazard Category 1

GHS Label elements:

Hazard symbols

Signal word

Danger

Hazard statements

Highly flammable liquid and vapor
Harmful if inhaled
Causes skin irritation
Causes serious eye irritation
May cause damage to organs through prolonged or repeated exposure.
May cause long lasting harmful effects to aquatic life.
May be fatal if swallowed and enters airways.

Precautionary statements

Use only in well ventilated area.
Control of exposure by mechanical ventilation in an unventilated or confined space.
Avoid breathing vapors and contact with skin and eyes.
Wear breathing apparatus/protective gloves/face protection.
Store in well-ventilated place.
Disposal must be in accordance with applicable federal, state, or local regulations.

Other hazards: —

SECTION 3-COMPOSITION/INFORMATION ON INGREDIENTS

CAS No.	Chemical Name	wt% by weight	EINECS No.
00108-88-3	Toluene	97.0 min.	203-625-9
Synonyms	**Methylbenzol; Methylbenzene; Toluol; Phenylmethane**		

SECTION 4-FIRST AID MEASURES

Description of necessary first aid measures

Eye:

1. Flush immediately with warm water for at least 20 minutes.
2. Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
3. If pain persists or recurs seek medical attention.
4. Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin:

1. Removing contaminated clothing, shoes, and leathery wearings, cleaning procedure is available before reused or waste treatment.
2. Washing affected area thoroughly with soap and water for at least 20 minutes.
3. Call a Physician if irritation develops or persists.

Ingestion:

1. If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomits.
2. If victim is conscious and alert, give 2～4 cupfuls of milk/water to dilute the substance in stomach.
3. Never give anything by mouth to an unconscious person.
4. Don't induce vomiting unless directed to do so by medical person.
5. If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
6. Then seek for medical attention.

Inhalation:

1. Remove from further exposure and flush thoroughly with air.
2. Lay patient down. Keep warm and rested.
3. Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
4. If respiratory irritation, seek immediate medical assistance and call a physician.

Most important symptoms/effects, acute and delayed

Headache, fatigue, drowsiness, insomnia, anorexia and pain in limbs, nervousness, impairment of memory.

Indication of immediate medical attention and special treatment needed, if necessary

For acute or short term repeated exposures to toluene:

Inhalation:

1. Inhalation overexposure can produce toxic effects. Monitor for respiratory distress.
2. If cough or difficulty in breathing develops, evaluate for upper respiratory tract inflammation, bronchitis, and pneumonitis. Administer supplemental oxygen with assisted ventilation, as required.
3. This material (or a component) sensitizes the heart to the effects of sympathomimetic amines. Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in individuals exposed to this material.
4. Administration of sympathomimetic drugs should be avoided.

Ingestion:

1. If ingested, this material presents a significant aspiration and chemical pneumonitis hazard.
2. Induction of emesis is not recommended.
3. Consider activated charcoal and/or gastric lavage.
4. If patient is obtunded, protect the airway by cuffed endotracheal intubation or by placement of the body in a Trendelenburg and left lateral decubitus position.

SECTION 5-FIRE FIGHTING MEASURES

Extinguishing media

Foam、CO_2、Dry chemical、Water fog.

Specific hazards arising from the chemical

1. Liquid and vapor are highly flammable.
2. Severe fire hazard when exposed to heat, flame and/or oxidizers.
3. Vapor may travel a considerable distance to source of ignition.
4. Heating may cause expansion or decomposition leading to violent rupture of containers.
5. On combustion, may emit toxic fumes of carbon monoxide (CO).

Special protective equipment and precautions for fire-fighters

1. Firefighters must use full bunker gear including NIOSH-approved positive pressure self-contained breathing apparatus to protect against potential hazardous combustion or decomposition products and oxygen deficiencies.
2. Evacuate area and fight the fire from a maximum distance or use unmanned hose holders or monitor nozzles.
3. Cover pooling liquid with foam.
4. Containers can build pressure if exposed to radiant heat; cool adjacent containers with flooding quantities of water until well after the fire is out.
5. Withdraw immediately from the area if there is a rising sound from a venting safety device or discoloration of vessels, tanks, or pipelines.
6. Be aware that burning liquid will float on water.
7. Notify appropriate authorities of potential fire and explosion hazard if liquid enter sewers or waterways

SECTION 6-ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedure

1. Personal protective equipment (specified in Section 8)
   Eyes : Chemical safety goggles are recommended, and a face shield is added when needed.
   Skin : Wear appropriate protective gloves to avoid skin contact.
   Clothing: When direct contact is likely, use rubberized clothings, apron and boots.
   Respiratory : When limits are exceeded, wear a respirator approved by NIOSH/MSHA for protection against organic dust, mists and vapors.
2. Remove all sources of ignition. No smoking, naked lights or ignition sources. Ventilate area of leak or spill.
3. Keep unnecessary and unprotected personnel from entering. Evacuate personnel from the danger area. Consult with an expert about the emergency procedures.

Environmental precautions

1. Prevent spillage from entering drains, surface, and groundwater.
2. Contain and recover liquid when possible. Use non-sparking tools and equipment.
3. Collect liquid in an appropriate container or absorb with an inert material (e.g. vermiculite, dry sand, earth), and place in a chemical waste container.
4. Report the accidental spill/release to Local/State government.

Methods and materials for containment and cleaning up

Minor spill:

1. Remove all ignition sources.
2. Clean up all spills immediately.
3. Avoid breathing vapors and contact with skin and eyes.
4. Control personal contact by using protective equipment.
5. Contain and absorb small quantities with vermiculite or other absorbent material.
6. Wipe up.
7. Collect residues in a flammable waste container.

Major spill

1. Clear area of personnel and move upwind.
2. Alert emergency responders and tell them location and nature of hazard.
3. May be violently or explosively reactive.
4. Wear breathing apparatus plus protective gloves.
5. Prevent spillage from entering drains or water course.
6. No smoking, naked lights or ignition sources. Increase ventilation.
7. Stop leak if safe to do so.
8. Water spray or fog may be used to disperse/absorb vapor.
9. Contain spill with sand, earth or vermiculite.
10. Use only spark-free shovels and explosion proof equipment.
11. Collect recoverable product into labeled containers for recycling..
12. Absorb remaining product with sand, earth or vermiculite.
13. Collect solid residues and seal in labeled drums for disposal.
14. Wash area and prevent runoff into drains.
15. If contamination of drains or waterways occurs, advise emergency services.

SECTION 7-HANDLING AND STORAGE

Precautions for safe handling

1. Wash thoroughly after handling.
2. Use only in well ventilated area.
3. Ground and bond containers when transferring.
4. Use spark-free tools and explosion proof equipment.
5. Empty containers retain product residue (liquid/vapor), and can be dangerous.
6. Do not pressurize, cut, weld, braze, solder, drill, or expose empty containers to heat, sparks or open flames.

Conditions for safe storage, including any incompatibilities

1. Store in original containers in approved flame-proof area.
2. No smoking, naked lights, heat or ignition sources.
3. DO NOT store in pits, depressions, basements or areas where vapors may be trapped.
4. Keep containers securely sealed.
5. Store away from incompatible materials in a cool, dry well ventilated area.
6. Protect containers against physical damage and check regularly for leaks.
7. Keep containers tightly closed and store in a cool, dry, well-ventilated place, plainly labeled, and out of closed vehicles.
8. Ground all equipment containing this material.
9. Observe manufacturer's storing and handling recommendations.
10. Containers should be able to withstand pressures expected from warming and cooling in storage. This flammable liquid should be stored in a separate safety cabinet or room. A refrigerated room is preferable for materials with a flash point temperature lower than 70°F (21°C).

SECTION 8-EXPOSURE CONTROLS, PERSONAL PROTECTION

OSHA - Final PELs : 200 ppm TWA.
OSHA Ceiling : 300ppm.
ACGIH : 50 ppm, skin -potential forcutaneous absorption.
NIOSH : 100 ppm TWA; 375 mg/m^3 TWA; 500 ppm IDLH.
Taiwan TWA : 100 ppm (skin).
Taiwan STEL : 125 ppm (skin).
Taiwan Ceiling : -------.
Taiwan BEI : 1 mg/l (before on duty).

Engineering control

1. Process should be located at least 17 meter (50 feet) away from open flames and all high temperature operations likely to cause ignition of the styrene monomer vapor.
2. In venting styrene monomer vapors, consideration should be given to possible halogenation of the vapors by low concentrations of free chlorine and bromine with the resultant formation of lacrimations.
3. Process should be designed so that the operator is not exposed to direct contact with Toluene or the vapor. The technical problems of designing equipment, providing adequate ventilation and operating procedures which promise maximum security and economy, can best be handled by competent engineers.
4. It is essential for safety that equipment be used and maintained as recommended by the manufacturer.
5. Tanks used to store or process Toluene should be closed vessels vented to a safe point of discharge in the outside atmosphere away from operating stations, roadways, and at least 17 meter (50 feet) from possible sources of ignitions. All sparks, flames, heated surface, or other sources of ignition should be kept away from all vents. It is advisable, to provide suction on vessels when inspection or observation openings are made, to minimize or eliminate escape of vapors.

Personal protective equipment

Eye Protection:
Safety glasses equipped with side shields are recommended as minimum protection in industrial settings. Chemical goggles should be worn during transfer operations or when there is a likelihood of misting, splashing, or spraying of this material. A suitable emergency eye wash water and safety shower should be located near the work station.

Skin protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Clothing:
Avoid skin contact. Wear long-sleeved fire-retardant garments (e.g., Nomex®) while working with flammable and combustible liquids. Additional chemical-resistant protective gear may be required if splashing or spraying conditions exist. This may include an apron, boots and additional facial protection. If product comes in contact with clothing, immediately remove soaked clothing and shower. Promptly remove and discard contaminated leather goods.

Respirators:
For known vapor concentrations above the occupational exposure guidelines (see below), use a NIOSH-approved organic vapor respirator if adequate protection is provided. Protection factors vary depending upon the type of respirator used. Respirators should be used in accordance with OSHA requirements (29 CFR 1910.134). For airborne vapor concentrations that exceed the recommended protection factors for organic vapor respirators, use a full-face, positive-pressure, supplied air respirator. Due to fire and explosion hazards, do not enter atmospheres containing concentrations greater than 10% of the lower flammable limit of this product.

SECTION 9-PHYSICAL AND CHEMICAL PROPERTIES

Appearance : Transparent liquid	Upper/lower explosive limits : 1.2%～7.1%
Odour : pleasant aromatic petroleum odour	Vapor Pressure : 22 mmHg @20℃/68℉
Odour threshold : 0.16～37 ppm (detect) 1.9～69 ppm (recognition)	Vapor Density : 3.1 (air=1)
PH : Not available	Relative density : 0.86 (water=1)
Melting/Freezing Point : －95 ℃	Solubility in water : 54～58 mg/100 ml
Initial boiling point/boiling range : 110.6 ℃	Partition coefficient : 2.73 (n-octanol/water)
Flash point : 4.4 ℃ (closed cup)	Auto-ignition temperature : 480℃
Evaporation Rate : 2.24 (BuAc=1)	Decomposition temperature : Not available
Flammability (solid/gas) : Not available	Viscosity : 0.6 mPa.s max @20℃
Molecular Formula : $C_6H_5CH_3$	Molecular Weight : 92.056

SECTION 10-STABILITY AND REACTIVITY

Reactivity
Vapor is explosive when exposed to heat or flame

Chemical stability
Stable at room temperature in closed containers under normal storage and handling conditions.

Possibility of hazardous reaction
Has not been reported.

Condition to avoid
Product is highly flammable – Keep away from sources of ignition. Avoid the higher temperatures. Keep away from open fire, heating elements and heat radiating surface and prevent from forming of the vapours mixtures with air in explosion limits.

Incompatible materials
Heat, flame, strong oxidizers, nitric and sulfuric acids, chlorine, nitrogen tetraoxide; will attack some forms of plastics, rubber, coatings.

Hazardous decomposition products
Carbon monoxide, carbon dioxide, hydrocarbons.

SECTION 11-TOXICOLOGICAL INFORMATION

Routes of exposure
Eye, Skin, inhalation, Ingestion.

Symptoms (treatments as indicated in Section 4)
Eye: The liquid produces a high level of eye discomfort and is capable of causing pain and severe conjunctivitis. Corneal injury may develop, with possible permanent impairment of vision, if not promptly and adequately treated. There is evidence that material may produce eye irritation in some persons and produce eye damage 24 hours or more after instillation. Severe inflammation may be expected with pain. There may be damage to the cornea. Unless treatment is prompt and adequate there may be permanent loss of vision. Conjunctivitis can occur following repeated exposure.

Skin: Contact with the material may damage the health of the individual; systemic effects may result following absorption. The material may cause moderate inflammation of the skin either following direct contact or after a delay of some time. Repeated exposure can cause contact dermatitis which is characterized by redness, swelling and blistering. Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

Ingestion: Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual. Swallowing of the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis; serious consequences may result. (ICSC13733). Considered an unlikely route of entry in commercial/industrial environments. The liquid may produce gastrointestinal discomfort and may be harmful if swallowed. Ingestion may result in nausea, pain and vomiting. Vomit entering the lungs by aspiration may cause potentially lethal chemical pneumonitis.

Inhalation: Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may be damaging to the health of the individual. There is some evidence to suggest that the material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage. Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by sleepiness, reduced alertness, loss of reflexes, lack of co-ordination, and vertigo. Inhalation of high concentrations of gas/vapour causes lung irritation with coughing and nausea, central nervous depression with headache and dizziness, slowing of reflexes, fatigue and inco-ordination. If exposure to highly concentrated solvent atmosphere is prolonged this may lead to narcosis, unconsciousness, even coma and possible death. The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing. Before starting consider control of exposure by mechanical ventilation.

Chronic exposure: There has been some concern that this material can cause cancer or mutations but there is not enough data to make an assessment. Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure.

Toxicity
LD50: <870 mg/kg (rat, oral)
LC50: 6000 ppm/6h (rat, inhalation)

Chronic effect
Carcinogenicity:
ACGIH : A4-Not classifiable as a Human Carcinogen.
OSHA : Possible select carcinogen.
IARC : Group 3 carcinogen.

Epide miology: Not available.

Teratogenicity: Teratogenic effects have occurred in experimental animals.

Reproductive Effects: Adverse reproductive effects have occurred in experimental animals.

Neurotoxicity: Not available.

Mutagenicity: Not available.

SECTION 12-ECOLOGICAL INFORMATION

Ecotoxicity
LC_{50} (96 hr.) Fish: 7.3～22.8 mg/l
EC_{50} (48 hr.) Water flea: —
Biocencentration factor (BCF): 1.67～380

Persistence and degradability
1. The material are expected to form a slick on the surface of waters after release in calm sea conditions. This is expected to evaporate and enter the atmosphere where it will be degraded through reaction with hydroxyl radicals.
2. Some of the material will become associated with benthic sediments, and it is likely to be spread over a fairly wide area of sea floor. Marine sediments may be either aerobic or anaerobic. The material, in probability, is biodegradable, under aerobic conditions. Evidence also suggests that the hydrocarbons may be degradable under anaerobic conditions although such degradation in benthic sediments may be a relatively slow process.
3. Under aerobic conditions the material will degrade to water and carbon dioxide, while under aerobic processes it will produce water, methane, carbon dioxide and carbon dioxide.
4. Based on test results, as well as theoretical considerations, the potential for bioaccumulation may be high. Toxic effects are often observed in species such as blue mussel, daphnia, freshwater green algae, marine copepods and amphipods.

Half-life (Air): 10～104 hr
Half-life (Surface water): 96～528 hr
Half-life (Ground water): 168～672 hr
Half-life (Soil): 96～528 hr

Bioaccumulative potential
This material is not expected to significantly bioaccumulate.

Mobility in soil: —

Other adverse effects: —

SECTION 13-DISPOSAL CONSIDERATIONS

Residues and spilled material are hazardous waste due to ignitability. Disposal must be in accordance with applicable federal, state, or local regulations.
The container for this product can present explosion or fire hazards, even when emptied. To avoid risk of injury, do not cut, puncture, or weld on or near this container. Since the emptied containers retain product residue, follow label warnings even after container is emptied.

SECTION 14-TRANSPORTATION INFORMATION

US DOT	Shipping Name	Toluene	Hazard Labels	
	Hazard Class	3		
	UN Number	1294		
	Packing Group	II		
Sea(IMO/IMDG)	Shipping Name	Toluene	Hazard Labels	
	Hazard Class	3.2		
	UN Number	1294		
	Packing Group	II		
	IMDG Code Page	3285		
	MARPOL	Not a DOT "Marine Pollutant" per 49 CFR 171.8.		
Air(ICAO/IATA)	Shipping Name	Toluene	Hazard Labels	
	Hazard Class	3.2		
	Subsidiary Class	1294		
	Packing Group	II		
RID/ ADR	No information available.			
Canadian TDG	Shipping Name	Toluene	Hazard Labels	
	Hazard Class	3		
	UN Number	1294		
	Packing Group	II		
	Subsidiary Class	9.2		

SECTION 15-REGULATORY INFORMATION

US FEDERAL

TSCA

CAS# 108-88-3 is listed on the TSCA inventory.

Health & Safety Reporting List

CAS# 108-88-3: Effective Date: 10/4/82; Sunset Date: 10/4/92

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

SARA

Section 302 (RQ)

CAS# 108-88-3 : final RQ = 1000 pounds (454 kg)

Section 302 (TPQ)

None of the chemicals in this material have a TPQ.

SARA Codes

CAS# 108-88-3 : acute, flammable.

Section 313

This material contains Toluene (CAS# 108-88-3, 99% & 100%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 372.

Clean Air Act

CAS# 108-88-3 is listed as a hazardous air pollutant (HAP).

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

Clean Water Act

CAS# 108-88-3 is listed as a Hazardous Substance under the CWA.
CAS# 108-88-3 is listed as a Priority Pollutant under the Clean Water Act.
CAS# 108-88-3 is listed as a Toxic Pollutant under the Clean Water Act.

OSHA

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

Toluene can be found on the following state right to know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.

WARNING: This product contains Toluene, a chemical known to the state of California to cause birth defects or other reproductive harm.

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols: XN F
Risk Phrases : R 10 Flammable.
R 20 Harmful by inhalation.
Safety Phrases : S 9 Keep container in a well-ventilated place.
S 16 Keep away from sources of ignition - No smoking.
S 25 Avoid contact with eyes.
S 29 Do not empty into drains.
S 33 Take precautionary measures against static discharges.

WGK (Water Danger/Protection)

CAS# 108-88-3: 2

United Kingdom Occupational Exposure Limits

CAS# 108-88-3: OES-United Kingdom, TWA 50 ppm TWA; 191 mg/m3 TWA.
CAS# 108-88-3: OES-United Kingdom, STEL 150 ppm STEL; 574 mg/m3 STEL.

CANADA

CAS#100-42-5 is listed on Canada's DSL/NDSL list.
This product has a WHMIS classification of B2, D2A (99%)/B3, D2A (100%).
CAS# 105-05-5 is not listed on Canada's Ingredient Disclosure List.

Exposure Limits

- CAS# 108-88-3: OEL-AUSTRALIA:TWA 100 ppm (375 mg/m3);STEL 150 ppm (560 mg/m3)
- OEL-BELGIUM:TWA 100 ppm (377 mg/m3);STEL 150 ppm (565 mg/m3)
- OEL-CZECHOSLOVAKIA:TWA 200 mg/m3;STEL 1000 mg/m3
- OEL-DENMARK:TWA 50 ppm (190 mg/m3);Skin
- OEL-FINLAND:TWA 100 ppm (375 mg/m3);STEL 150 ppm; Skin
- OEL-FRANCE:TWA 100 ppm (375 mg/m3);STEL 150 ppm (560 mg/m3)
- OEL-GERMANY:TWA 100 ppm (380 mg/m3)
- OEL-HUNGARY:TWA 100 mg/m3;STEL 300 mg/m3;Skin
- OEL-JAPAN:TWA 100 ppm (380 mg/m3)
- OEL-THE NETHERLANDS:TWA 100 ppm (375 mg/m3);Skin
- OEL-THE PHILIPPINES:TWA 100 ppm (375 mg/m3)
- OEL-POLAND:TWA 100 mg/m3
- OEL-RUSSIA:TWA 100 ppm; STEL 50 mg/m3
- OEL-SWEDEN:TWA 50 ppm (200 mg/m3);STEL 100 ppm (400 mg/m3);Skin
- OEL-SWITZERLAND:TWA 100 ppm (380 mg/m3);STEL 500 ppm
- OEL-THAILAND:TWA 200 ppm; STEL 300 ppm
- OEL-TURKEY:TWA 200 ppm (750 mg/m3)
- OEL-UNITED KINGDOM:TWA 100 ppm (375 mg/m3);STEL 150 ppm; Skin OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV

SECTION 16-OTHER INFORMATION

References and sources

1. CHEMINFO Data Bank, CCINFO CD, 2005-3
2. HAZARD TEXT Data Bank, TOMES PLUS CD, Vol.65, 2005
3. RETECS Data Bank, TOMES CPS CD, Vol.65, 2005
4. HSDB Data Bank, TOMES CPS CD, Vol.65, 2005
5. Hazardous Substance Data Bank, Environment Protection, Administration, Executive Yuan, ROC (Taiwan)
6. Chemwatch Data Bank, 2005-1
7. SDS, GHS in Taiwan, Council of Labor Affairs, Executive Yuan, ROC (Taiwan)

Version	Date	Remark
Version 1	06/01/1998	Original Version.
Version 2	04/20/2001	Updated 10 sections to 16 sections.
Version 3	08/01/2003	Updated “SECTION 9-PHYSICAL AND CHEMICAL PROPERTIES”.
Version 4	01/01/2006	Updated “SECTION 14-TRANSPORTATION INFORMATION”.
Version 5	08/05/2008	Updated each section by GHS SDS.
Prepared by	Safety & Environment Protection Section, Taiwan SM Corporation Kaohsiung Plant.	

SAFETY DATA SHEET

Version 6.8
Revision Date 09/07/2024
Print Date 09/08/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : PCB No 28

Product Number : 35601
Brand : Sigma-Aldrich
Index-No. : 602-039-00-4
CAS-No. : 7012-37-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Specific target organ toxicity - repeated exposure (Category 2), H373
Short-term (acute) aquatic hazard (Category 1), H400
Long-term (chronic) aquatic hazard (Category 1), H410

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For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal Word Warning

Hazard Statements

H373	May cause damage to organs through prolonged or repeated exposure.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary Statements

P260	Do not breathe dust.
P273	Avoid release to the environment.
P314	Get medical advice/ attention if you feel unwell.
P391	Collect spillage.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms : 2,4,4'-Trichlorobiphenyl
2,4,4'-PCB

Formula : $C_{12}H_7Cl_3$
Molecular weight : 257.54 g/mol
CAS-No. : 7012-37-5
EC-No. : 230-293-2
Index-No. : 602-039-00-4

Component	Classification	Concentration
2,4,4'-Trichlorobiphenyl		
	STOT RE 2; Aquatic Acute 1; Aquatic Chronic 1; H373, H400, H410 Concentration limits: >= 0.005 %: STOT RE 2, H373; >= 0.005 %: STOT RE 2, H373; M-Factor - Aquatic Acute: 10 - Aquatic Chronic: 10	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

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SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Call in physician.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

In case of eye contact
After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

If swallowed
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Water Foam Carbon dioxide (CO2) Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Carbon oxides
Hydrogen chloride gas
Combustible.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information
Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

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SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Avoid inhalation of dusts. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up dry. Dispose of properly. Clean up affected area. Avoid generation of dusts.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Work under hood. Do not inhale substance/mixture.

Hygiene measures
Change contaminated clothing. Preventive skin protection recommended. Wash hands after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Dry.

Storage class
Storage class (TRGS 510): 11: Combustible Solids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

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Component	CAS-No.	Value	Control parameters	Basis
2,4,4'-Trichlorobiphenyl	7012-37-5	TWA	0.001 mg/m3	USA. NIOSH Recommended Exposure Limits
	Remarks	Potential Occupational Carcinogen		

8.2 Exposure controls

Appropriate engineering controls
Change contaminated clothing. Preventive skin protection recommended. Wash hands after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
Handle with impervious gloves.

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

Body Protection
protective clothing

Respiratory protection
Recommended Filter type: Filter type P2
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when dusts are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains.

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SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odor	No data available
c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/ range: 56 °C (133 °F)
f)	Initial boiling point and boiling range	No data available
g)	Flash point	> 100.00 °C (> 212.00 °F)
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Density	No data available
	Relative density	No data available
n)	Water solubility	insoluble
o)	Partition coefficient: n-octanol/water	No data available
p)	Autoignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	none

9.2 Other safety information

No data available

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SECTION 10: Stability and reactivity

10.1 Reactivity
The following applies in general to flammable organic substances and mixtures: in correspondingly fine distribution, when whirled up a dust explosion potential may generally be assumed.

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
Violent reactions possible with:
strong oxidising agents

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
Oral: No data available
Inhalation: No data available
Dermal: No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: 1 - Group 1: Carcinogenic to humans (2,4,4'-Trichlorobiphenyl)

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

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Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
May cause damage to organs through prolonged or repeated exposure.

Aspiration hazard
No data available

11.2 Additional Information

RTECS: DV8840000
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - > 0.16 mg/l - 96.0 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - > 0.16 mg/l - 48 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties
No data available

12.7 Other adverse effects
No data available

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SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)
UN number: 3432 Class: 9 Packing group: II
Proper shipping name: Polychlorinated biphenyls, solid
Reportable Quantity (RQ):
Marine pollutant: yes Poison Inhalation Hazard: No

IMDG
UN number: 3432 Class: 9 Packing group: II EMS-No: F-A, S-A
Proper shipping name: POLYCHLORINATED BIPHENYLS, SOLID
Marine pollutant : yes
Marine pollutant : yes

IATA
UN number: 3432 Class: 9 Packing group: II
Proper shipping name: Polychlorinated biphenyls, solid

SECTION 15: Regulatory information

CERCLA Reportable Quantity
This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity
This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity
This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : No SARA Hazards

SARA 313 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

US State Regulations

Massachusetts Right To Know
No components are subject to the Massachusetts Right to Know Act.

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Pennsylvania Right To Know

2,4,4'-Trichlorobiphenyl 7012-37-5

Maine Chemicals of High Concern

Product does not contain any listed chemicals

Vermont Chemicals of High Concern

Product does not contain any listed chemicals

Washington Chemicals of High Concern

Product does not contain any listed chemicals

California Prop. 65

WARNING: This product can expose you to chemicals including 2,4,4'-Trichlorobiphenyl, which is/are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

The ingredients of this product are reported in the following inventories:

TSCA : Product contains substance(s) not listed on TSCA inventory.

TSCA list

No substances are subject to a Significant New Use Rule.

The following substance(s) is/are subject to TSCA 12(b) export notification requirements:
2,4,4'-Trichlorobiphenyl 7012-37-5

SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 6.8 Revision Date: 09/07/2024 Print Date: 09/08/2024

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SAFETY DATA SHEET
Xylene

SECTION 1: Identification of the substance/mixture and of the company/undertaking

Date issued 11.11.2013

1.1. Product identifier

Product name	Xylene
Chemical name	Xylene
Synonyms	Xylol, dimethyl benzene, xylenol
REACH Reg No.	01-2119488216-32-0000
CAS no.	1330-20-7
EC no.	215-535-7
Index no.	601-022-00-9
Article no.	13000000

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/preparation For the preparation of paints and as a solvent. General purpose cleaner.

1.3. Details of the supplier of the safety data sheet

Manufacturer

Company name	Fred Holmberg & Co AB
Office address	Geijersgatan 8
Postal address	Box 60056
Postcode	S-216 10
City	Limhamn
Country	Sweden
Tel	+46 (0)40 15 79 20
Fax	+46 (0)40 16 22 95
E-mail	info@holmberg.se
Website	http://www.holmberg.se/en/

1.4. Emergency telephone number

Emergency telephone 112 (Europe)

SECTION 2: Hazards identification

2.1. Classification of substance or mixture

Classification according to 67/548/EEC or 1999/45/EC	Xi; R38 Xn; R20/21 R10
Classification according to Regulation (EC) No 1272/2008 [CLP/GHS]	Flam. Liq. 3; H226; Acute tox. 4; H312; Skin Irrit. 2; H315; Acute tox. 4; H332;

2.2. Label elements

Hazard Pictograms (CLP)

Signal word	Danger
Hazard statements	H226 Flammable liquid and vapour. H312 Harmful in contact with skin. H315 Causes skin irritation. H332 Harmful if inhaled.
Precautionary statements	P210 Keep away from heat/sparks/open flames/hot surfaces. – No smoking. P233 Keep container tightly closed. P243 Take precautionary measures against static discharge. P280 Wear protective gloves/protective clothing/eye protection/face protection. P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. P303 + P361 + P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. P331 Do NOT induce vomiting. P403 + P235 Store in a well-ventilated place. Keep cool.

2.3. Other hazards

Other hazards	Not known.

SECTION 3: Composition/information on ingredients

3.2. Mixtures

Substance	Identification	Classification	Contents
Xylene	CAS no.: 1330-20-7 EC no.: 215-535-7 Index no.: 601-022-00-9	R10 Xn; R20/21 Xi; R38 Flam. Liq. 3; H226 Acute tox. 4; H332 Acute tox. 4; H312 Skin Irrit. 2; H315 Note : C	75 - 90 %
Ethylbenzene	CAS no.: 100-41-4 EC no.: 202-849-4 Index no.: 601-023-00-4 Synonyms: Ethylbenzene	F; R11 Xn; R20 Flam. Liq. 2; H225 Acute tox. 4; H332	10 - 25 %

Column headings	CAS no. = Chemical Abstracts Service; EU (Einecs or Elincs number) = European inventory of Existing Commercial Chemical Substances; Ingredient name = Name as specified in the substance list (substances that are not included in the substance list must be translated, if possible). Contents given in; %, %wt/wt, %vol/wt, %vol/vol, mg/m3, ppb, ppm, weight%, vol%
HH/HF/HE	T+ = Very toxic, T = Toxic, C = Corrosive, Xn = Harmful, Xi = Irritating, E = Explosive, O = Oxidizing, F+ = Extremly flammable, F = Very flammable, N = Environmental hazard

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation	Move the exposed person to fresh air at once. Get medical attention if any discomfort continues.
Skin contact	Remove contaminated clothes and rinse skin thoroughly with water.
Eye contact	Immediately flush with plenty of water for up to 15 minutes. Remove any contact lenses and open eyes wide apart. Get medical attention if any discomfort continues.
Ingestion	NEVER MAKE AN UNCONSCIOUS PERSON VOMIT OR DRINK FLUIDS! Do not induce vomiting. Rinse mouth with water. Get medical attention.

4.2. Most important symptoms and effects, both acute and delayed

Information for health personnel	Treat Symptomatically. Do not give victim anything to drink if he is

unconscious.

4.3. Indication of any immediate medical attention and special treatment needed

Specific details on antidotes	No recommendation given.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media	Extinguish with alcohol-resistant foam, carbon dioxide, dry powder or water fog.

5.2. Special hazards arising from the substance or mixture

Fire and explosion hazards	Solvent vapours may form explosive mixtures with air.
Hazardous combustion products	Fire creates: Carbon monoxide (CO). Carbon dioxide (CO_2).

5.3. Advice for firefighters

Fire fighting procedures	No specific fire fighting procedure given.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal protection measures	Ensure suitable personal protection (including respiratory protection) during removal of spillages in a confined area. Ventilate well. Stop leak if possible without risk. Avoid contact with skin and eyes. Do not breathe vapour.

6.2. Environmental precautions

Environmental precautionary measures	Avoid discharge into drains, water courses or onto the ground.

6.3. Methods and material for containment and cleaning up

Cleaning method	Dam and absorb spillages with sand, earth or other non-combustible material.

6.4. Reference to other sections

Other instructions	No recommendation given.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Handling	Keep away from heat, sparks and open flame. Take precautionary measures against static discharges. Mechanical ventilation may be required.

Protective Safety Measures

Advice on general occupational hygiene	Provide easy access to water supply and eye wash facilities.

7.2. Conditions for safe storage, including any incompatibilities

Storage	Keep away from heat, sparks and open flame. Ground container and transfer equipment to eliminate static electric sparks. Store in a cool and well-ventilated place.

7.3. Specific end use(s)

Specific use(s)	Not entered.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

DNEL / PNEC

Method of testing	Contents
DNEL	Group: Industrial Exposure route: Inhalation Exposure frequency: Short term (acute) Critical Component: Etylbenzen Value: 289 mg/kg/dag

DNEL	Group: Industrial Exposure route: Inhalation Exposure frequency: Long term (repeated) Critical Component: Etylbenzen Type of effect: Systemic effect Value: 77 mg/kg/dag
DNEL	Group: Industrial Exposure route: Dermal Exposure frequency: Long term (repeated) Critical Component: Etylbenzen Type of effect: Systemic effect Value: 180 mg/kg/dag
DNEL	Group: Consumer Exposure route: Inhalation Exposure frequency: Long term (repeated) Critical Component: Etylbenzen Type of effect: Systemic effect Value: 14,8 mg/kg/dag
DNEL	Group: Consumer Exposure route: Dermal Exposure frequency: Long term (repeated) Critical Component: Etylbenzen Type of effect: Systemic effect Value: 108 mg/kg/dag
DNEL	Group: Consumer Exposure route: Oral Exposure frequency: Long term (repeated) Critical Component: Etylbenzen Type of effect: Systemic effect Value: 1,6 mg/kg/dag
DNEL	Group: Industrial Exposure route: Inhalation Exposure frequency: Short term (acute) Critical Component: xylen Value: 442 mg/kg/dag
DNEL	Group: Industrial Exposure route: Inhalation Exposure frequency: Long term (repeated) Critical Component: xylen Type of effect: Systemic effect Value: 221 mg/kg/dag
DNEL	Group: Industrial Exposure route: Dermal Exposure frequency: Long term (repeated) Critical Component: xylen Type of effect: Systemic effect Value: 3182 mg/kg/dag
DNEL	Group: Consumer Exposure route: Inhalation Exposure frequency: Short term (acute) Critical Component: xylen Value: 260 mg/kg/dag
DNEL	Group: Consumer Exposure route: Inhalation Exposure frequency: Long term (repeated) Critical Component: xylen Type of effect: Systemic effect

	Value: 65,3 mg/kg/dag
DNEL	Group: Consumer Exposure route: Dermal Exposure frequency: Long term (repeated) Critical Component: xylen Type of effect: Systemic effect Value: 1872 mg/kg/dag
DNEL	Group: Consumer Exposure route: Oral Exposure frequency: Long term (repeated) Critical Component: xylen Type of effect: Systemic effect Value: 12,5 mg/kg/dag
Exposure guidelines	Country of origin: Sverige Limit value type: NGV 200 mg/m3 OEL Short Term Value: 450 mg/m3 Source: Nationella hygieniska gränsvärden, AFS 2005:17
Other Information	Ovanstående NGV resp. KTV gäller både xylen och etylbenzen

8.2. Exposure controls

Occupational exposure limits	Provide adequate ventilation. Observe Occupational Exposure Limits and minimise the risk of inhalation of vapours. Protective gloves and goggles are recommended. Provide eyewash, quick drench.

Safety signs

Respiratory protection

Respiratory protection	Respiratory protection must be used if air contamination exceeds acceptable level. Use respiratory equipment with gas filter, type A2.

Hand protection

Hand protection	Use protective gloves. Chemical resistant gloves required for prolonged or repeated contact. Gloves of nitrile rubber, PVA or Viton are recommended.

Eye / face protection

Eye protection	Use safety goggles or face shield in case of splash risk.

Skin protection

Skin protection (except hands)	Wear appropriate clothing to prevent any possibility of skin contact.

Hygiene / Environmental

Specific hygiene measures	Wash hands after contact.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	Fluid.
Colour	Colourless.
Odour	Aromatic.
Comments, pH (as supplied)	Not relevant.
Melting point/melting range	Value: < -48 °C
Boiling point / boiling range	Value: 136-145 °C
Flash point	Value: 27 °C
Evaporation rate	Value: 13,5
Explosion limit	Value: 1-7,1 %
Vapour pressure	Value: 1 kPa Test temperature: 20 °C

Vapour density	Value: 3,7
Specific gravity	Value: 0,870 kg/m3 Test temperature: 20 °C
Solubility description	Soluble in: Organic solvents. Not soluble in water.
Partition coefficient: n-octanol/water	Value: 3,15
Spontaneous combustability	Value: > 432-530 °C
Viscosity	Value: < 0,90 mPas Method of testing: Kinematisk Test temperature: 25 °C

9.2. Other information

SECTION 10: Stability and reactivity

10.1. Reactivity

Reactivity: Heating may cause a fire.

10.2. Chemical stability

Stability: Stable under the prescribed storage conditions.

10.3. Possibility of hazardous reactions

Possibility of hazardous reactions: Not known.

10.4. Conditions to avoid

Conditions to avoid: Avoid heat, flames and other sources of ignition.

10.5. Incompatible materials

Materials to avoid: Avoid contact with oxidising agents (e.g. nitric acid, peroxides and chromates). Strong acids.

10.6. Hazardous decomposition products

Hazardous decomposition products: Fire creates: Carbon monoxide (CO). Carbon dioxide (CO_2).

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Toxicological Information:

Other toxicological data: Acute Toxicity (Oral LD50): mg/kg (oral rat) > 2000
Acute Toxicity (Inhalation LC50): mg/l (vapours) (4h) > 20
Acute Toxicity (Dermal LD50): mg/kg Rabbit > 2000

Toxicological data for substances

Potential acute effects

Inhalation	In high concentrations, vapours are narcotic and may cause headache, fatigue, dizziness and nausea. Icke klassificerad som aspirationstoxisk (Not classified as asp. tox.)
Skin contact	Prolonged or frequent contact may cause redness, itching, eczema and skin cracking. Defats the skin.
Eye contact	May irritate and cause redness and pain.
Ingestion	Ingestion of large amounts may cause unconsciousness. However, ingestion may cause nausea, headache, dizziness and intoxication. Ingestion may cause irritation of the gastrointestinal tract, vomiting and diarrhoea. May cause irritation to the mouth and throat.

Delayed effects / repeated exposure

Sensitisation	Not known.
Chronic effects	None known.

Carcinogenic, Mutagenic or Reprotoxic

Carcinogenicity	None.
Mutagenicity	Not known.
Teratogenic properties	Suspected of damaging the unborn child

Reproductive toxicity	Not known.

SECTION 12: Ecological information

12.1. Toxicity

Acute aquatic, fish	Value: 2 mg/l Method of testing: LC50 Fish, species: Roccus saxatilis Duration: 96h
Acute aquatic, algae	Value: > 3,2 mg/l Method of testing: IC50 Algae, species: Selenastrum Capricornum Duration: 72h
Acute aquatic, Daphnia	Value: 8,5 mg/l Method of testing: EC50 Daphnia, species: Daphnia magna Duration: 48h

12.2. Persistence and degradability

Persistence and degradability description	Lättnedbrytbar av biologiska organismer.
Chemical oxygen demand (COD)	Value: 5 Method of testing: COD
Biological oxygen demand (BOD)	Value: 0,55 Method of testing: BOD

12.3. Bioaccumulative potential

Bioaccumulative potential	Will not bio-accumulate.
Bioconcentration factor (BCF)	Value: 22 Method of testing: BCF

12.4. Mobility in soil

Mobility	The product is insoluble in water and will spread on the water surface.

12.5. Results of PBT and vPvB assessment

PBT assessment results	This substance is not classified as PBT or vPvB.

12.6. Other adverse effects

Other adverse effects / Remarks	None known.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Specify the appropriate methods of disposal	Confirm disposal procedures with environmental engineer and local regulations. Absorb in vermiculite or dry sand and dispose of at a licenced hazardous waste collection point. Liquid components can be disposed of by incineration.
Product classified as hazardous waste	Yes
Packaging classified as hazardous waste	Yes

SECTION 14: Transport information

14.1. UN number

ADR	1307
RID	1307
IMDG	1307
ICAO/IATA	1307

14.2. UN proper shipping name

ADR	XYLENES

RID	XYLENES
IMDG	XYLENES
ICAO/IATA	XYLENES

14.3. Transport hazard class(es)

ADR	3
Hazard no.	30
RID	3
ADN	33
IMDG	3
ICAO/IATA	3

14.4. Packing group

ADR	III
RID	III
IMDG	III
ICAO/IATA	III

14.5. Environmental hazards

Comment	Not relevant.

14.6. Special precautions for user

EmS	F-E, S-D

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

SECTION 15: Regulatory information

EC no.	215-535-7

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

Other Label Information	Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 with amendments.
Legislation and regulations	Dangerous Substance Directive 67/548/EEC. The Chemicals (Hazard Information and Packaging for Supply) Regulations 2009 (S.I 2009 No. 716). The List of Wastes (England) (Amendment) Regulations 2005. (SI 2005 No. 895). Avfallsförordningen (2011:927).

15.2. Chemical safety assessment

SECTION 16: Other information

Hazard symbol

R-phrases	R10 Flammable. R38 Irritating to skin. R20/22 Harmful by inhalation and if swallowed. R38 Irritating to skin.
S-phrases	S7 Keep container tightly closed. S16 Keep away from sources of ignition - No smoking.
Classification according to Regulation (EC) No 1272/2008 [CLP/GHS]	Flam. Liq. 3; H226; Acute tox. 4; H312; Skin Irrit. 2; H315;

	Acute tox. 4; H332;
List of relevant R-phrases (under headings 2 and 3).	R38 Irritating to skin. R11 Highly flammable. R10 Flammable. R20/21 Harmful by inhalation and in contact with skin. R20 Harmful by inhalation.
List of relevant H-phrases (Section 2 and 3).	H332 Harmful if inhaled. H312 Harmful in contact with skin. H225 Highly flammable liquid and vapour. H226 Flammable liquid and vapour. H315 Causes skin irritation.
Responsible for safety data sheet	Fred Holmberg & Co AB

SAFETY DATA SHEET

Version 4.10
Revision Date 05/27/2016
Print Date 01/23/2017

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : *trans*-1,2-Dichloroethene

Product Number : 48527
Brand : Supelco
Index-No. : 602-026-00-3

CAS-No. : 156-60-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 2), H225
Acute toxicity, Inhalation (Category 4), H332
Acute aquatic toxicity (Category 3), H402
Chronic aquatic toxicity (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H225 Highly flammable liquid and vapour.
H332 Harmful if inhaled.
H412 Harmful to aquatic life with long lasting effects.

Precautionary statement(s)
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P233 Keep container tightly closed.
P240 Ground/bond container and receiving equipment.
P241 Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242 Use only non-sparking tools.

P243	Take precautionary measures against static discharge.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ eye protection/ face protection.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P312	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P403 + P235	Store in a well-ventilated place. Keep cool.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : *trans*-1,2-Dichloroethene
trans-1,2-Dichloroethylene
trans-Acetylene dichloride

Formula : $C_2H_2Cl_2$
Molecular weight : 96.94 g/mol
CAS-No. : 156-60-5
EC-No. : 205-860-2
Index-No. : 602-026-00-3

Hazardous components

Component	Classification	Concentration
trans-Dichloroethylene		
	Flam. Liq. 2; Acute Tox. 4; Aquatic Acute 3; Aquatic Chronic 3; H225, H332, H412	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Use explosion-proof equipment.Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Recommended storage temperature 2 - 8 °C

Light sensitive. Air and moisture sensitive. Refrigerate before opening.
Storage class (TRGS 510): Flammable liquids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
trans-Dichloroethylene	156-60-5	TWA	200.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Central Nervous System impairment Eye irritation		

		TWA	200.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Eye irritation		
		TWA	200 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Eye irritation		

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid, clear Colour: light yellow
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -50 °C (-58 °F) - lit.
f)	Initial boiling point and boiling range	48 °C (118 °F) - lit.
g)	Flash point	6.0 °C (42.8 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or	Upper explosion limit: 12.8 %(V) Lower explosion limit: 9.7 %(V)

	explosive limits	
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	1.257 g/cm3 at 25 °C (77 °F)
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Vapours may form explosive mixture with air.

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Oxidizing agents, Bases

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 1,235 mg/kg

LD50 Oral - Mouse - 2,122 mg/kg
Remarks: Behavioral:Altered sleep time (including change in righting reflex). Behavioral:Somnolence (general depressed activity). Behavioral:Ataxia.

LC50 Inhalation - Rat - 24100 ppm
Remarks: Behavioral:Somnolence (general depressed activity).

LD50 Dermal - Rabbit - > 5,000 mg/kg
Remarks: Prolonged skin contact may cause skin irritation and/or dermatitis. Nutritional and Gross Metabolic:Weight loss or decreased weight gain.

No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Skin irritation - 24 h

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Eye irritation

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: Not available

prolonged or repeated exposure can cause:, narcosis, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Kidney -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 220.00 mg/l - 48 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Harmful to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1150 Class: 3 Packing group: II
Proper shipping name: 1,2-Dichloroethylene
Reportable Quantity (RQ): 1000 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 1150 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: 1,2-DICHLOROETHYLENE

IATA

UN number: 1150 Class: 3 Packing group: II
Proper shipping name: 1,2-Dichloroethylene

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Fire Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
trans-Dichloroethylene	156-60-5	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
trans-Dichloroethylene	156-60-5	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
trans-Dichloroethylene	156-60-5	1993-04-24

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Flam. Liq.	Flammable liquids
H225	Highly flammable liquid and vapour.
H332	Harmful if inhaled.
H402	Harmful to aquatic life.

HMIS Rating

Health hazard:	1
Chronic Health Hazard:	*
Flammability:	3
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	3
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.10 Revision Date: 05/27/2016 Print Date: 01/23/2017

SAFETY DATA SHEET

Version 4.6
Revision Date 03/02/2015
Print Date 02/18/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Trichloroethylene

Product Number : 251402
Brand : Sigma-Aldrich
Index-No. : 602-027-00-9

CAS-No. : 79-01-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Germ cell mutagenicity (Category 2), H341
Carcinogenicity (Category 1B), H350
Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336
Acute aquatic toxicity (Category 3), H402
Chronic aquatic toxicity (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H336 May cause drowsiness or dizziness.
H341 Suspected of causing genetic defects.
H350 May cause cancer.
H412 Harmful to aquatic life with long lasting effects.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear eye protection/ face protection.
P280	Wear protective gloves.
P281	Use personal protective equipment as required.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P312	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	TCE Trichloroethene
Formula	:	C_2HCl_3
Molecular weight	:	131.39 g/mol
CAS-No.	:	79-01-6
EC-No.	:	201-167-4
Index-No.	:	602-027-00-9

Hazardous components

Component	Classification	Concentration
Trichloroethylene Included in the Candidate List of Substances of Very High Concern (SVHC) according to Regulation (EC) No. 1907/2006 (REACH)		
	Skin Irrit. 2; Eye Irrit. 2A; Muta. 2; Carc. 1B; STOT SE 3; Aquatic Acute 3; Aquatic Chronic 3; H315, H319, H336, H341, H350, H412	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Light sensitive. Handle and store under inert gas.
Storage class (TRGS 510): Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Trichloroethylene	79-01-6	TWA	10.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Central Nervous System impairment cognitive decrement Renal toxicity Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Suspected human carcinogen		
		STEL	25.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment cognitive decrement Renal toxicity Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Suspected human carcinogen		
		Potential Occupational Carcinogen See Appendix C See Appendix A		
		See Table Z-2		
		TWA	100.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.19-1967		
		CEIL	200.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.19-1967		
		Peak	300.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.19-1967		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Trichloroethylene	79-01-6	Trichloroacetic acid	15.0000 mg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift at end of workweek			
		Trichloroethanol	0.5000 mg/l	In blood	ACGIH - Biological Exposure Indices (BEI)
		End of shift at end of workweek			
		Trichloroethylene		In blood	ACGIH - Biological Exposure Indices (BEI)
		End of shift at end of workweek			
		Trichloroethylene		In end-exhaled air	ACGIH - Biological Exposure Indices (BEI)
		End of shift at end of workweek			

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid, clear Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -84.8 °C (-120.6 °F) - lit.
f)	Initial boiling point and boiling range	86.7 °C (188.1 °F) - lit.
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower	Upper explosion limit: 10.5 %(V)

	flammability or explosive limits	Lower explosion limit: 8 %(V)
k)	Vapour pressure	81.3 hPa (61.0 mmHg) at 20.0 °C (68.0 °F)
l)	Vapour density	No data available
m)	Relative density	1.463 g/mL at 25 °C (77 °F)
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	log Pow: 2.29log Pow: 5
p)	Auto-ignition temperature	410.0 °C (770.0 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Oxidizing agents, Strong bases, Magnesium

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 4,920 mg/kg

LC50 Inhalation - Mouse - 4 h - 8450 ppm

LD50 Dermal - Rabbit - > 20,000 mg/kg

No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Severe skin irritation - 24 h

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Eye irritation - 24 h

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
Laboratory experiments have shown mutagenic effects.
In vitro tests showed mutagenic effects

Carcinogenicity

This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Possible human carcinogen

IARC:	1 - Group 1: Carcinogenic to humans (Trichloroethylene)
NTP:	Reasonably anticipated to be a human carcinogen (Trichloroethylene)
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: KX4550000

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, Exposure to and/or consumption of alcohol may increase toxic effects., Gastrointestinal disturbance, Kidney injury may occur., narcosis
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - 41 mg/l - 96.0 h
	LOEC - other fish - 11 mg/l - 10.0 d
	NOEC - Oryzias latipes - 40 mg/l - 10.0 d
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 18.00 mg/l - 48 h
Toxicity to algae	IC50 - Pseudokirchneriella subcapitata (green algae) - 175.00 mg/l - 96 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
Does not bioaccumulate.

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Harmful to aquatic life with long lasting effects.

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1710 Class: 6.1 Packing group: III
Proper shipping name: Trichloroethylene
Reportable Quantity (RQ): 100 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 1710 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: TRICHLOROETHYLENE

IATA
UN number: 1710 Class: 6.1 Packing group: III
Proper shipping name: Trichloroethylene

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Trichloroethylene	79-01-6	2007-07-01

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Trichloroethylene	79-01-6	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Trichloroethylene	79-01-6	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Trichloroethylene	79-01-6	2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer. Trichloroethylene	CAS-No. 79-01-6	Revision Date 2011-09-01
WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.	CAS-No. 79-01-6	Revision Date 2011-09-01

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
Eye Irrit.	Eye irritation
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H336	May cause drowsiness or dizziness.
H341	Suspected of causing genetic defects.
H350	May cause cancer.
H402	Harmful to aquatic life.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.6 Revision Date: 03/02/2015 Print Date: 02/18/2016

SAFETY DATA SHEET

Version 4.17
Revision Date 03/03/2015
Print Date 02/19/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Trichlorofluoromethane

Product Number : 254991
Brand : Aldrich

CAS-No. : 75-69-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Dermal (Category 4), H312

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)
H312 Harmful in contact with skin.

Precautionary statement(s)
P280 Wear protective gloves/ protective clothing.
P302 + P352 + P312 IF ON SKIN: Wash with plenty of soap and water. Call a POISON CENTER or doctor/ physician if you feel unwell.
P363 Wash contaminated clothing before reuse.
P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : Fluorotrichloromethane
CFC-11

Formula	:	CCl_3F CCl_3F
Molecular weight	:	137.37 g/mol
CAS-No.	:	75-69-4
EC-No.	:	200-892-3

Hazardous components

Component	Classification	Concentration
Trichlorofluoromethane		
	Acute Tox. 4; H312	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Hydrogen chloride gas, Hydrogen fluoride

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Recommended storage temperature 2 - 8 °C

Contents under pressure.
Storage class (TRGS 510): Non Combustible Liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Trichlorofluoromethane	75-69-4	C	1,000.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Cardiac sensitization Not classifiable as a human carcinogen		
		C	1,000.000000 ppm 5,600.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	1,000.000000 ppm 5,600.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 480 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.2 mm
Break through time: 30 min

Material tested:Dermatril® P (KCL 743 / Aldrich Z677388, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid, clear Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	-110.99 - -109.99 °C (-167.78 - -165.98 °F)
f)	Initial boiling point and boiling range	23.7 °C (74.7 °F) - lit.
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	885.7 hPa (664.3 mmHg) at 20.0 °C (68.0 °F) 2,701.2 hPa (2,026.1 mmHg) at 55.0 °C (131.0 °F)
l)	Vapour density	No data available
m)	Relative density	1.494 g/cm3 at 25 °C (77 °F)
n)	Water solubility	1 g/l
o)	Partition coefficient: n-octanol/water	log Pow: 2.53
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available

t) Oxidizing properties No data available

9.2 Other safety information

Surface tension 18.0 mN/m at 25.0 °C (77.0 °F)

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents, Sodium/sodium oxides, Potassium, Magnesium, Aluminum, Zinc

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - > 15,000 mg/kg

LC50 Inhalation - Rat - 0.3 h - 130000 ppm
Remarks: Behavioral:Tremor. Behavioral:Convulsions or effect on seizure threshold. Respiratory disorder

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: PB6125000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated., Nausea, Dizziness, Headache, Vomiting, Diarrhoea, Abdominal pain, Weakness, Unconsciousness

Liver -

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3082 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, liquid, n.o.s. (Trichlorofluoromethane)
Reportable Quantity (RQ): 5000 lbs

Poison Inhalation Hazard: No

IMDG
Not dangerous goods

IATA
Not dangerous goods

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Trichlorofluoromethane	75-69-4	2007-07-01

SARA 311/312 Hazards
Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Trichlorofluoromethane	75-69-4	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Trichlorofluoromethane	75-69-4	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Trichlorofluoromethane	75-69-4	2007-07-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
H312	Harmful in contact with skin.

HMIS Rating

Health hazard:	1
Chronic Health Hazard:	
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	1
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.17 Revision Date: 03/03/2015 Print Date: 02/19/2016

SAFETY DATA SHEET

Version 5.8
Revision Date 03/13/2015
Print Date 01/29/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Vanadium(V) oxide

Product Number : 204854
Brand : Aldrich
Index-No. : 023-001-00-8

CAS-No. : 1314-62-1

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 4), H302
Acute toxicity, Inhalation (Category 4), H332
Serious eye damage (Category 1), H318
Germ cell mutagenicity (Category 2), H341
Reproductive toxicity (Category 2), H361
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Specific target organ toxicity - repeated exposure (Category 1), H372
Acute aquatic toxicity (Category 2), H401
Chronic aquatic toxicity (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H302 + H332 Harmful if swallowed or if inhaled
H318 Causes serious eye damage.
H335 May cause respiratory irritation.
H341 Suspected of causing genetic defects.
H361 Suspected of damaging fertility or the unborn child.
H372 Causes damage to organs through prolonged or repeated exposure.

H411	Toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell. Rinse mouth.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/ physician.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	O_5V_2
Molecular weight	:	181.88 g/mol
CAS-No.	:	1314-62-1
EC-No.	:	215-239-8
Index-No.	:	023-001-00-8

Hazardous components

Component	Classification	Concentration
Vanadium pentoxide		
	Acute Tox. 4; Eye Dam. 1; Muta. 2; Repr. 2; STOT SE 3; STOT RE 1; Aquatic Acute 2; Aquatic Chronic 2; H302 + H332, H318, H335, H341, H361, H372, H411	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Vanadium/vanadium oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.
Storage class (TRGS 510): Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Vanadium pentoxide	1314-62-1	C	0.100000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		C	0.500000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	Remarks	Ceiling limit is to be determined from breathing-zone air samples.		
		TWA	0.050000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Upper Respiratory Tract irritation Lower Respiratory Tract irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Confirmed animal carcinogen with unknown relevance to humans		
		TWA	0.05 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Upper Respiratory Tract irritation Lower Respiratory Tract irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Confirmed animal carcinogen with unknown relevance to humans		
		C	0.050000 mg/m3	USA. NIOSH Recommended Exposure Limits
		15 minute ceiling value		
		C	0.050000 mg/m3	USA. NIOSH Recommended Exposure Limits
		15 minute ceiling value		
		C	0.100000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Ceiling limit is to be determined from breathing-zone air samples.		
		C	0.500000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Ceiling limit is to be determined from breathing-zone air samples.		
		C	0.050000 mg/m3	USA. NIOSH Recommended Exposure Limits
		15 minute ceiling value		
		C	0.050000 mg/m3	USA. NIOSH Recommended Exposure Limits
		15 minute ceiling value		
		C	0.050000 mg/m3	USA. NIOSH Recommended Exposure Limits
		15 minute ceiling value		
		C	0.050000 mg/m3	USA. NIOSH Recommended Exposure Limits
		15 minute ceiling value		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Vanadium pentoxide	1314-62-1	Vanadium	0.0500 mg/g	In urine	
	Remarks	End of shift at end of workweek			

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 690 °C (1,274 °F) - lit.
f)	Initial boiling point and boiling range	No data available
g)	Flash point	Not applicable

h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	3.35 g/mL at 25 °C (77 °F)
n)	Water solubility	904 g/l at 20 °C (68 °F) - OECD Test Guideline 105
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	The substance or mixture is not classified as oxidizing.

9.2 Other safety information

Solubility in other solvents	Ethanol - insoluble

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong acids

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
Harmful if swallowed. Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

LC50 Inhalation - Rat - female - 4 h - 2.21 mg/l
(OECD Test Guideline 403)

LC50 Dermal - Rat - > 2,500 mg/kg
(OECD Test Guideline 402)

No data available

Skin corrosion/irritation
Skin - in vitro assay
Result: No skin irritation

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Risk of serious damage to eyes.
(OECD Test Guideline 405)

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
Laboratory experiments have shown mutagenic effects.
In vitro tests showed mutagenic effects

Carcinogenicity

No data available

IARC:	2B - Group 2B: Possibly carcinogenic to humans (Vanadium pentoxide)
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
Possible risk of congenital malformation in the fetus.
Suspected human reproductive toxicant

No data available

Specific target organ toxicity - single exposure
May cause respiratory irritation.
Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Specific target organ toxicity - repeated exposure
Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard
No data available

Additional Information
RTECS: Not available

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence
Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 5.2 mg/l - 96.0 h
Toxicity to daphnia and other aquatic invertebrates	LC50 - Daphnia magna (Water flea) - 1.52 mg/l - 48 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
Toxic to aquatic life with long lasting effects.
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 2862 Class: 6.1 Packing group: III
Proper shipping name: Vanadium pentoxide
Reportable Quantity (RQ): 1000 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 2862 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: VANADIUM PENTOXIDE
Marine pollutant:yes

IATA
UN number: 2862 Class: 6.1 Packing group: III
Proper shipping name: Vanadium pentoxide

15. REGULATORY INFORMATION

SARA 302 Components
The following components are subject to reporting levels established by SARA Title III, Section 302:

	CAS-No.	Revision Date
Vanadium pentoxide	1314-62-1	2007-07-01

SARA 313 Components

	CAS-No.	Revision Date
Vanadium pentoxide	1314-62-1	2007-07-01

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Vanadium pentoxide	1314-62-1	2007-07-01

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Vanadium pentoxide	1314-62-1	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Vanadium pentoxide	1314-62-1	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Vanadium pentoxide	1314-62-1	2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No.	Revision Date
Vanadium pentoxide	1314-62-1	2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Eye Dam.	Serious eye damage
H302	Harmful if swallowed.
H302 + H332	Harmful if swallowed or if inhaled
H318	Causes serious eye damage.
H332	Harmful if inhaled.
H335	May cause respiratory irritation.
H341	Suspected of causing genetic defects.
H361	Suspected of damaging fertility or the unborn child.
H372	Causes damage to organs through prolonged or repeated exposure.
H401	Toxic to aquatic life.

HMIS Rating

Health hazard:	4
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	3
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.8 Revision Date: 03/13/2015 Print Date: 01/29/2016

SAFETY DATA SHEET

Version 3.11
Revision Date 12/01/2015
Print Date 02/18/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Vinyl chloride

Product Number : 387622
Brand : Aldrich
Index-No. : 602-023-00-7

CAS-No. : 75-01-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable gases (Category 1), H220
Gases under pressure (Liquefied gas), H280
Carcinogenicity (Category 1A), H350

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H220 Extremely flammable gas.
H280 Contains gas under pressure; may explode if heated.
H350 May cause cancer.

Precautionary statement(s)
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P281 Use personal protective equipment as required.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.

P377	Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381	Eliminate all ignition sources if safe to do so.
P405	Store locked up.
P410 + P403	Protect from sunlight. Store in a well-ventilated place.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS
May form explosive peroxides.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	Chloroethylene
Formula	:	C_2H_3Cl
Molecular weight	:	62.50 g/mol
CAS-No.	:	75-01-4
EC-No.	:	200-831-0
Index-No.	:	602-023-00-7

Hazardous components

Component	Classification	Concentration
Vinyl chloride		
	Flam. Gas 1; Press. Gas Liquefied gas; Carc. 1A; SA ; H220, H280, H350,	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Clean up promptly by sweeping or vacuum.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid inhalation of vapour or mist.
Use explosion-proof equipment.Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

Contents under pressure. Light sensitive.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Vinyl chloride	75-01-4	TWA	1 ppm	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	1 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Liver damage Lung cancer Confirmed human carcinogen		
		STEL	5 ppm	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	1 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		STEL	5 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		See 1910.1017		
		Potential Occupational Carcinogen See Appendix A		

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Splash contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 120 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: Liquefied gas
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -153.8 °C (-244.8 °F) - lit.
f)	Initial boiling point and boiling range	-13.4 °C (7.9 °F) - lit.
g)	Flash point	-61.0 °C (-77.8 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or	Upper explosion limit: 33 %(V) Lower explosion limit: 3.6 %(V)

	explosive limits	
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	0.911 g/cm3 at 25 °C (77 °F)
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.
Contains the following stabiliser(s):
Hydroquinone (>=0 - <=0.0001 %)
Phenol (>=0 - <=0.01 %)

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Heat, flames and sparks. Extremes of temperature and direct sunlight.

10.5 Incompatible materials
Chemically active metals, Copper

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available

LC50 Inhalation - Rat - 0.3 h - 180000 ppm
Remarks: Behavioral:Tremor. Behavioral:Convulsions or effect on seizure threshold. Respiratory disorder

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

This is or contains a component that has been reported to be carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Human carcinogen.

IARC:	1 - Group 1: Carcinogenic to humans (Vinyl chloride)
NTP:	Known to be human carcinogen (Vinyl chloride)
OSHA:	OSHA specifically regulated carcinogen (Vinyl chloride)

Reproductive toxicity
No data available

Overexposure may cause reproductive disorder(s) based on tests with laboratory animals.

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: KU9625000

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Central nervous system -
Stomach - Irregularities - Based on Human Evidence (Phenol)
Liver - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1086 Class: 2.1
Proper shipping name: Vinyl chloride, stabilized
Reportable Quantity (RQ): 1 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 1086 Class: 2.1 EMS-No: F-D, S-U
Proper shipping name: VINYL CHLORIDE, STABILIZED

IATA
UN number: 1086 Class: 2.1
Proper shipping name: Vinyl chloride, stabilized
IATA Passenger: Not permitted for transport

15. REGULATORY INFORMATION

SARA 302 Components
The following components are subject to reporting levels established by SARA Title III, Section 302:

	CAS-No.	Revision Date
Phenol	108-95-2	2007-07-01
Hydroquinone	123-31-9	2007-07-01

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Vinyl chloride	75-01-4	2007-07-01

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Vinyl chloride	75-01-4	2007-07-01
Phenol	108-95-2	2007-07-01
Hydroquinone	123-31-9	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Vinyl chloride	75-01-4	2007-07-01
Phenol	108-95-2	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Vinyl chloride	75-01-4	2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No.	Revision Date
Vinyl chloride	75-01-4	2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

	May displace oxygen and cause rapid suffocation.
Carc.	Carcinogenicity
Flam. Gas	Flammable gases
H220	Extremely flammable gas.
H280	Contains gas under pressure; may explode if heated.
H350	May cause cancer.
Press. Gas	Gases under pressure
SA	Simple Asphyxiant

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	4
Physical Hazard	3

NFPA Rating

Health hazard:	2
Fire Hazard:	4
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 3.11 Revision Date: 12/01/2015 Print Date: 02/18/2016

SAFETY DATA SHEET

Version 4.9
Revision Date 08/24/2015
Print Date 02/07/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Zinc

Product Number : 324930
Brand : Aldrich
Index-No. : 030-001-00-1

CAS-No. : 7440-66-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Self-heating substances and mixtures (Category 1), H251
Substances and mixtures, which in contact with water, emit flammable gases (Category 1), H260
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H251 Self-heating: may catch fire.
H260 In contact with water releases flammable gases which may ignite spontaneously.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P223 Do not allow contact with water.
P231 + P232 Handle under inert gas. Protect from moisture.
P235 + P410 Keep cool. Protect from sunlight.
P273 Avoid release to the environment.

P280	Wear protective gloves/ eye protection/ face protection.
P335 + P334	Brush off loose particles from skin. Immerse in cool water/ wrap in wet bandages.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P391	Collect spillage.
P402 + P404	Store in a dry place. Store in a closed container.
P407	Maintain air gap between stacks/ pallets.
P413	Store bulk masses greater than .? kg/ .? lbs at temperatures not exceeding .? °C/ .? °F.
P420	Store away from other materials.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Combustible dust

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	Zn
Molecular weight	:	65.39 g/mol
CAS-No.	:	7440-66-6
EC-No.	:	231-175-3
Index-No.	:	030-001-00-1

Hazardous components

Component	Classification	Concentration
Zinc powder (pyrophoric)		
	Self-heat. 1; Water-react. 1; Aquatic Acute 1; Aquatic Chronic 1; H251, H260, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Dry powder

5.2 Special hazards arising from the substance or mixture
Zinc/zinc oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Do not flush with water. Keep in suitable, closed containers for disposal. Contain spillage, pick up with an electrically protected vacuum cleaner or by wet-brushing and transfer to a container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.Keep away from sources of ignition - No smoking.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.
Never allow product to get in contact with water during storage.

Keep in a dry place.
Storage class (TRGS 510): Pyrophoric and self-heating hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Protective gloves against thermal risks

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Flame retardant protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder Colour: grey
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 420 °C (788 °F) - lit.
f)	Initial boiling point and boiling range	907 °C (1,665 °F) - lit.
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	May form combustible dust concentrations in air
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	1 hPa (1 mmHg) at 487 °C (909 °F)

l)	Vapour density	No data available
m)	Relative density	7.133 g/mL at 25 °C (77 °F)
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	log Pow: 5
p)	Auto-ignition temperature	The substance or mixture is classified as self heating with the category 1.
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Reacts violently with water.

10.4 Conditions to avoid
Exposure to moisture

10.5 Incompatible materials
Strong acids and oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
Did not cause sensitisation on laboratory animals.

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as

probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: ZG8600000

chills, dry throat, sweet taste, Fever, Cough, Nausea, Vomiting, Weakness
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Cyprinus carpio (Carp) - 450.0 µg/l - 96.0 h
Toxicity to daphnia and other aquatic invertebrates	LC50 - Daphnia magna (Water flea) - 0.068 mg/l - 48 h
	mortality NOEC - Daphnia (water flea) - 0.101 - 0.14 mg/l - 7 d

12.2 Persistence and degradability

12.3 Bioaccumulative potential

Bioaccumulation	Algae - 7 d at 16 °C - 5 µg/l
	Bioconcentration factor (BCF): 466

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Contact a licensed professional waste disposal service to dispose of this material. Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1436 Class: 4.3 (4.2) Packing group: II
Proper shipping name: Zinc powder
Reportable Quantity (RQ): 1000 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 1436 Class: 4.3 (4.2) Packing group: II EMS-No: F-G, S-O
Proper shipping name: ZINC POWDER
Marine pollutant:yes

IATA
UN number: 1436 Class: 4.3 (4.2) Packing group: II
Proper shipping name: Zinc powder

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Zinc powder (pyrophoric)	7440-66-6	1993-04-24

SARA 311/312 Hazards
Reactivity Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Zinc powder (pyrophoric)	7440-66-6	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Zinc powder (pyrophoric)	7440-66-6	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Zinc powder (pyrophoric)	7440-66-6	1993-04-24

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
H251	Self-heating: may catch fire.
H260	In contact with water releases flammable gases which may ignite spontaneously.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
Self-heat.	Self-heating substances and mixtures

HMIS Rating
Health hazard: 0

Chronic Health Hazard:	
Flammability:	3
Physical Hazard	1

NFPA Rating

Health hazard:	0
Fire Hazard:	3
Reactivity Hazard:	1
Special hazard.I:	W

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.9 Revision Date: 08/24/2015 Print Date: 02/07/2016

ATTACHMENT F

JOBSITE SAFETY INSPECTION CHECKLIST

Jobsite Safety Inspection Checklist

Date: _____ **Inspected By:** _____

Location: _____ **Project #:** _____

Check one of the following: **A:** Acceptable **NA**: Not Applicable **D**: Deficiency

	A	NA	D	Remark
1. CHASP available onsite for inspection?				
2. Health & Safety Compliance agreement (in CHASP) appropriately signed by Langan employees and contractors?				
3. Hospital route map with directions posted on site?				
4. Emergency Notification List posted on site?				
5. First Aid kit available and properly stocked?				
6. Personnel trained in CPR/First Aid on site?				
7. MSDSs readily available, and all workers knowledgeable about the specific chemicals and compounds to which they may be exposed?				
8 Appropriate PPE being worn by Langan employees and contractors?				
9. Project site safe practices ("Standing Orders") posted?				
10. Project staff have 40-hr./8-hr./Supervisor HAZWOPER training?				
11. Project staff medically cleared to work in hazardous waste sites and fit-tested to wear respirators, if needed?				
12. Respiratory protection readily available?				
13. Health & Safety Incident Report forms available?				
14. Air monitoring instruments calibrated daily and results recorded on the Daily Instrument Calibration check sheet?				
15. Air monitoring readings recorded on the air monitoring data sheet/field log book?				
16. Subcontract workers have received 40-hr./8-hr./Spvsr. HAZWOPER training, as appropriate?				
17. Subcontract workers medically cleared to work on site, and fit-tested for respirator wear?				
18. Subcontract workers have respirators readily available?				
19. Mark outs of underground utilities done prior to initiating any subsurface activities?				
20. Decontamination procedures being followed as outlined in CHASP?				
21. Are tools in good condition and properly used?				
22. Drilling performed in areas free from underground objects including utilities?				

23. Adequate size/type fire extinguisher supplied?				
24. Equipment at least 20 feet from overhead powerlines?				
25. Evidence that drilling operator is responsible for the safety of his rig.				
26. Trench sides shored, layer back, or boxed?				
27. Underground utilities located and authorities contacted before digging?				
28. Ladders in trench (25-foot spacing)?				
29. Excavated material placed more than 2 feet away from excavation edge?				
30. Public protected from exposure to open excavation?				
31. People entering the excavation regarding it as a permit-required confined space and following appropriate procedures?				
32. Confined space entry permit is completed and posted?				
33. All persons knowledgeable about the conditions and characteristics of the confined space?				
34. All persons engaged in confined space operations have been trained in safe entry and rescue (non-entry)?				
35. Full body harnesses, lifelines, and hoisting apparatus available for rescue needs?				
36. Attendant and/or supervisor certified in basic first aid and CPR?				
37. Confined space atmosphere checked before entry and continuously while the work is going on?				
38. Results of confined space atmosphere testing recorded?				
39. Evidence of coordination with off-site rescue services to perform entry rescue, if needed?				
40. Are extension cords rated for this work being used and are they properly maintained?				
41. Are GFCIs provided and being used?				

Unsafe Acts:

Notes:

ATTACHMENT G

JOB SAFETY ANALYSIS FORM

LANGAN	Job Safety Analysis (JSA) Health and Safety
JSA TITLE: **JSA NUMBER:**	**DATE CREATED:** **CREATED BY**: **REVISION DATE:** **REVISED BY:**
Langan employees must review and revise the Job Safety Analysis (JSA) as needed to address the any site specific hazards not identified. Employees must provide their signatures on the last page of the JSA indicating they have review the JSA and are aware the potential hazards associated with this work and will follow the provided preventive or corrective measures.	

PERSONAL PROTECTIVE EQUIPMENT REQUIRED: (PPE): ■ Required ☒ As Needed		
☐ Steel-toed boots	☐ Nitrile gloves	☐ Dermal Protection (Specify)
☐ Long-sleeved shirt	☐ Leather/ Cut-resistant gloves	☐ High visibility vest/clothing
☐ Safety glasses	☐ Face Shield	☐ Hard hat
ADDITIONAL PERSONAL PROTECTIVE EQUIPMENT NEEDED (Provide specific type(s) or descriptions)		
☐ Air Monitoring:	☐ Respirators:	☐ Other:
☐ Dermal Protection:	☐ Cartridges:	☐ Other:

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE OR CORRECTIVE ACTION
1.	1. 2.	1a. 1b. 2a. 2b.
2.	1.	1
Additional items identified in the field.		
Additional Items.		

If additional items are identified during daily work activities, please notify all relevant personnel about the change and document on this JSA.

LANGAN	Job Safety Analysis (JSA) Health and Safety
JSA Title: COVID-19 Awareness – Site Work **JSA Number: JSA046-00**	
A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.	

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Boots	☐ Long Sleeves	☐ Safety Vest (Class 2)	☐ Hard Hat	☐ Hearing Protection
☐ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☐ Nitrile Gloves	☐ PVC Gloves
☐ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☒ Other: Alcohol-based hand sanitizer, disinfectant wipes/spray				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
1. All Activities	1. Transmittal/exposure of COVID-19	1. Ask yourself and your managers – is this work essential? Can this be done remotely? 2. Stay home if sick or showing symptoms of COVID-19 (e.g. fever, cough, etc.). 3. Carry nitrile gloves, alcohol-based hand sanitizer, face coverings and disinfectant wipes/spray during field work. 4. Check federal, state, and/or local travel restrictions **prior** to travel. Many states, counties, and cities are passing strict "shelter-in-place" or business restrictions in response to COVID-19. 5. Immediately notify Beverly Williams or Rory Johnston (Supervisor if employee chooses) if you display symptoms of COVID-19. Symptoms include fever (over 100.4 F), cough, and shortness of breath. 6. Notify Beverly Williams or Rory Johnston, Supervisor and Coronavirus Task Force if you had close contact with an individual who tested positive or displayed symptoms of COVID-19. 7. Do not touch your face, to the extent possible. 8. Wear face coverings when around other worker to minimize spread of COVID-19. (May be required in certain states or locations.)

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
		9. Practice social distancing, maintaining at least 6 feet of distance between yourself and others. Avoid gatherings of more than 10 people. Limit, to the extent possible, contact with public items/objects. 10. Clean your hands frequently with soap and water for at least 20 seconds especially after you have been in a public place, or after blowing your nose, coughing, sneezing, or using the rest room. 11. If soap and water are not readily available, use a hand sanitizer that contains at least 60% alcohol. Cover all surfaces of your hands and rub them together until they feel dry. 12. Cover your mouth and nose with a tissue when you cough or sneeze or use the inside of your elbow. 13. Clean and disinfect frequently touched surfaces daily, for example, cell phones, computer equipment, headsets, tables, doorknobs, light switches, countertops, handles, desks, toilets, faucets, and sinks.
2. Travel to Jobsite	1. Transmittal/exposure of COVID-19 between passengers 2. Transmittal/exposure of COVID-19 from previous occupants (rental and fleet vehicles) 3. Transmittal/exposure of COVID-19 while refueling	1. Limit the number of occupants to each vehicle to 2 people. Employees should sit as far away from each other as possible. 2. Disinfect high "hand-traffic" areas of the vehicle: Door handles, steering wheel, turn signal and control rods, dashboard controls, seatbelts, armrests, etc. To the extent possible, do not use recycled air for heat/AC and travel with the windows open. 3. Use hand sanitizer before and after pumping gas and only return to the inside of the vehicle after refueling is complete. 4. Wear nitrile gloves if available or disinfect the key pad, pump handle, and fuel grade button prior to use. 5. Recommend face coverings are worn to minimize spread of COVID-19.
3. Conduct Tailgate Safety Meeting & Complete H&S Paperwork	1. Transmittal/exposure of COVID-19 between meeting participants	1. Practice social distancing, maintaining at least 6 feet of distance between yourself and others. 2. Recommend face coverings are worn when around other workers to minimize spread of COVID-19, 3. Hold meetings outside and keep in mind wind direction. To the extent possible, remain cross-wind from other people. 4. Designate a single person to maintain sign-in sheets/permits throughout the day to limit the passing of pens/clipboards between people. 5. Each person should complete their own JSA, even if they are completing similar tasks as others in order to limit the passing of paper/pens/clipboards between people. 6. Include COVID-19 topics and prevention measures in safety meetings.
4. Conduct Site Work	1. Transmittal/exposure of COVID-19 between site workers and public.	1. Practice social distancing maintaining 6 feet of distance between yourself and others. 2. Recommend face coverings are worn when around other workers to minimize spread of COVID-19, 3. To the extent possible, do not interact with the public. If it is necessary, politely explain you are practicing social distance and request they stay at least 6 feet away and they do not attempt to pass objects to you. 4. Wear nitrile gloves during site work underneath the appropriate gloves for your task. Utilize appropriate decontamination procedures, securely bag all waste (including nitrile gloves) generated during site work and dispose of.

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
		5. Do not share tools. Each person should be equipped with the tools to complete their task or tasks should be divided to remove the need to share tools. If tools must be shared, surfaces should be disinfected. 6. Clean and disinfect surfaces of rental tools and equipment upon receipt. To the extent possible rent equipment from Langan's internal equipment reservation center, where cleaning/disinfecting procedures can be verified.
5. Use of Construction Trailers	1. Transmittal/exposure of COVID-19 between site workers and others.	1. Avoid use of shared trailers, if possible. Minimize trailer use to essential personnel. 2. Practice social distancing; maintaining 6 feet of distance between yourself and others in trailer. 3. Clean and disinfect areas including desks, phones, chairs, and other common areas, before and after use.
6. Purchasing Food from a Restaurant	1. Transmittal/exposure of COVID-19 from other customers, staff, surfaces.	1. To the extent possible, bring your own food. 2. If you must visit a restaurant, call ahead for take-out or "contactless delivery." Do not dine in. When picking up food, follow guidelines for Job Step #8: Purchasing Supplies at Retail/Shipping Centers. 3. Wash hands before and after eating.
7. Smoking Cigarettes	1. Transmittal/exposure of COVID-19 by touching mouth with hands	1. Cigarette smokers are at greater risk of complications arising from COVID-19. Nicotine patches/lozenges/gum, smoking cessation programs, and prescription medications may aid in "kicking the habit" if you decide to quit. 2. Wash hands thoroughly before and after smoking. 3. Discard cigarette butts properly. Do not light cigarettes from others and do not give cigarettes to others.
8. Hotel Stay	1. Transmittal/exposure of COVID-19 from previous occupants, hotel staff, common areas.	1. Verify the hotel chain/brand has modified cleaning procedures to reflect risk of COVID-19. Most hotel companies have issued statements on their websites and in email blasts reflecting these new procedures. 2. Use the front door, and not peripheral entrances. Front doors of hotels are usually automatic. 3. Request ground floor room to avoid elevator use and a room that has not be utilized in 48-72 hours. 4. If elevator use is required, do not directly touch elevator buttons with your hands. Do not ride elevators with other people, to the extent possible. 5. Bring disinfecting wipes or sanitizing spray. Upon arrival, disinfect high "hand-traffic" areas of the hotel room: Door handles, light switches, shower/sink faucet handles, TV remote, curtain/blind handles. Clean these surfaces daily. 6. Place the "Do Not Disturb" Sign on your door to prevent people (housekeeping) from entering your room. 7. Avoid common spaces and hotel sponsored events where crowds will be present. 8. Confirm hotel cleaning procedures have been modified to address COVID-19. Confirm no COVID-19 cases have occurred in hotel
9. Purchasing Supplies at Retail/Shipping Centers	1. Transmittal/exposure of COVID-19 from other customers, staff, surfaces.	1. Plan your travel to limit the need to visit retail/shipping centers. 2. Practice social distancing, maintaining at least 6 feet of distance between yourself and others. If the store is too crowded/small, consider visiting another store or returning at a different time. 3. Avoid high "hand-traffic" items/areas like door handles (i.e. use your shoulder, hip/butt, or open with a disposable napkin/paper towel), credit cards terminals (i.e. use Apple/Android pay if available), shopping carts/baskets (i.e. bring your own shopping

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
		bags), counter tops (i.e. ask clerk if you can hold the items while they are scanned) and bulk/buffet items (i.e. just avoid them). 4. Disinfect your hands before and after visiting a retail/shipping center.

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN	Job Safety Analysis (JSA) Health and Safety
JSA Title: Environmental Sampling **JSA Number:** JSA021-01 **A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.**	 **S** – ***Stop,*** *what has changed?* **T** – ***Think*** *about the task* **E** – ***Evaluate*** *potential hazards* **P** – ***Plan*** *safe approach* **S** - ***Start*** *task /* ***Stop*** *& regroup*

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☐ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☐ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☒ Fire Resistant Clothing	☐ Rubber Boots
☒ Insect/Animal Repellent	☒ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☒ Other: Tyvek Sleeves				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
1. Drive to sample location	1. Rough/Off Road terrain	1. Pay attention to road conditions such as road erosion, unprotected embankments, and soft road conditions.
2. Sample Collection (Walking)	1. Slip/Trips/Falls 2. Back strains 3. Wildlife (Insects, Stray animals, rodents) 4. Poisonous vegetation	1. Minimize distance to sample area/ Plan route and check surface prior to carrying heavy equipment/ Locate safest access point/ Follow good housekeeping procedures/ Mark significant below grade hazards (holes, trenches) with spray paint or cones/ Wear foot protection with ankle support and gripping soles. 2. Use proper lifting techniques/ Use wheeled transport/ Obtain assistance where and when needed/ Consider load weight when evaluating what is safe and unsafe to carry. 3. Be aware of surroundings for the presence of wildlife. Do not approach stray animals. Carry and use animal repellant when needed/ Use bug spray when needed. 4. Keep skin covered/ Identify and avoid poisonous vegetation/ Clean areas after contact with suspected vegetation.
3. Sample Collection (Water)	1. Drowning Hazards 2. Chemical burns (when adding acid preservative to sample) 3. Back Strains 4. Ergonomic issues 5. Slip/Trips/Falls	1. Use buddy system/ Wear flotation vest if water is deeper than 2 feet or swift moving/ Select working area with stable footing. Do not attempt to cross or stand in swift moving water. 2. Wear proper PPE (Nitrile gloves, Tyvek Sleeves) 3. Use proper lifting techniques/ Use wheeled transport/ Obtain assistance where and when needed/ Consider load weight when evaluating what is safe or unsafe to carry. 4. When possible avoid bending over for long periods of time/ Use a small stool for sitting or knee pad for kneeling.

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
		5. Minimize distance to sample area/ Plan route and check surface prior to carrying heavy equipment/ Locate safest access point/ Follow good housekeeping procedures/ Mark significant below grade hazards (holes, trenches) with spray paint or cones/ Wear foot protection with ankle support and gripping soles/ Avoid standing water or slippery terrain.
4. All activities	1. Slips/ Trips/ Falls 2. Hand injuries, cuts, or lacerations during manual handling of materials 3. Foot injuries 4. Back injuries 5. Traffic 6. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 7. High Noise levels 8. Overhead hazards 9. Heat Stress/ Cold Stress 10. Eye Injuries	1. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 2. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery, or dirty objects before handling / Wear leather/ cut-resistant gloves 3. Wear Langan approved safety shoes 4. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 5. Wear high visibility clothing & vest / Use cones or signs to designate work area 6. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 7. Wear hearing protection 8. Wear hard hat / Avoid areas were overhead hazards exist. 9. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 10. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: **Subsurface Investigation**
JSA Number: **JSA030-01**

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.

S – ***Stop,*** *what has changed?*
T – ***Think*** *about the task*
E – ***Evaluate*** *potential hazards*
P – ***Plan*** *safe approach*
S - ***Start*** *task /* ***Stop*** *& regroup*

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☒ Safety Goggles	☐ Face Shield	☐ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☒ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☒ Other: Dielectric Overshoes, Sun Block				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
5. Transport equipment to work area	2. Back/strain 3. Slip/Trip/Falls 4. Traffic 5. Cuts/abrasions/contusions from equipment 6. Accidents due to vehicle operations	1. Use proper lifting techniques/Use wheeled transport 2. Minimize distance to work area/unobstructed path to work area/follow good housekeeping procedures 3. Wear proper PPE (high visibility vest or clothing) 4. Wear proper PPE (leather gloves, long sleeves, Langan approved safety shoes) 5. Observe posted speed limits/ Wear seat belts at all times
6. Traffic	1. Hit by moving vehicle	1. Use traffic cones and signage/ Use High visibility traffic vests and clothing/ Caution tape when working near active roadways.
7. Field Work (drilling, resistivity testing, and inspection)	1. Biological Hazards: insects, rats, snakes, poisonous plants, and other animals 2. Heat stress/injuries 3. Cold Stress/injuries 4. High Energy Transmission Lines 5. Underground Utilities 6. Electrical (soil resistivity testing)	1. Inspect work area to identify biological hazards. Wear light colored long sleeve shirt and long pants/ Use insect repellant as necessary/ Beware of tall grass, bushes, woods, and other areas where ticks may live/ Avoid leaving garbage on site to prevent attracting animals/ Identify and avoid contact with poisonous plants/Beware of rats, snakes, or stray animals. 2. Wear proper clothing (light colored)/ drink plenty of water/ take regular breaks/use sun block 3. Wear proper clothing/ dress in layers/ take regular breaks. 4. Avoid direct contact with high energy transmission lines/ position equipment at least 15 feet or as required by PSE&G from the transmission lines/ wear proper PPE (dielectric overshoes 15 kV minimum rating).

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
		5. Call one-call service before performing intrusive field work/ Review utility mark-outs and available utility drawings (with respect to proposed work locations)/ Follow Underground Utility Guidelines 6. See AGI Sting R1 operating manual for specific concerns during operating instrument
8. All activities	1. Slips/ Trips/ Falls 2. Hand injuries, cuts, or lacerations during manual handling of materials 3. Foot injuries 4. Back injuries 5. Traffic 6. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 7. High Noise levels 8. Overhead hazards 9. Heat Stress/ Cold Stress 10. Eye Injuries	7. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 8. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 9. Wear Langan approved safety shoes 10. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 11. Wear high visibility clothing & vest / Use cones or signs to designate work area 12. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 13. Wear proper hearing protection 14. Wear hard hat / Avoid areas were overhead hazards exist. 15. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 16. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: **Field Sampling**
JSA Number: **JSA022-01**

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.

S – ***Stop,*** *what has changed?*
T – ***Think*** *about the task*
E – ***Evaluate*** *potential hazards*
P – ***Plan*** *safe approach*
S - ***Start*** *task /* ***Stop*** *& regroup*

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☐ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☒ Traffic Cones/Signs	☐ Life Vest/Jacket	
☐ Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
9. Unpack/Transport equipment to work area.	7. Back Strains 8. Slip/Trips/Falls 9. Cuts/Abrasions from equipment 10. Contusions from dropped equipment	6. Use proper lifting techniques/Use wheeled transport 7. Minimize distance to work area/Unobstructed path to work area/follow good housekeeping procedures. Mark slip/trip/fall hazards with orange safety cones. 8. Wear proper PPE (leather gloves, long sleeves). 9. Wear proper PPE (Langan approved safety shoes).
10. Initial Site Arrival-Site Assessment	5. Traffic	5. Situational awareness (be alert of your surroundings). Secure area from through traffic.
11. Surface Water Sampling	6. Contaminated media. Skin/eye contact with biological agents and/or chemicals.	6. Wear appropriate PPE (Safety glasses, appropriate gloves). Review (M)SDS for all chemicals being.
12. Sampling from bridges	1. Struck by vehicles	1. Wear appropriate PPE (Safety Vest). Use buddy system and orange safety cones.
13. Icing of Samples/ Transporting coolers/equipment from work area.	11. Back Strains 12. Slips/Trips/Falls 13. Cuts/Abrasions from equipment 14. Pinch/Crushing Hazards.	17. Drain coolers of water. Use proper lifting techniques. Use wheeled transport. 18. Have unobstructed path from work area. Aware of surroundings. 19. Wear proper PPE (Leather gloves, long sleeves) 20. Wear proper PPE (Leather gloves, long sleeves)
14. Site Departure	1. Contaminated PPE/Vehicle	1. Contaminated PPE should be disposed of on-site. Remove boots and soiled clothing for secure storage in trunk. Wash hands promptly.

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
15. All activities	1. Slips/ Trips/ Falls 2. Hand injuries, cuts, or lacerations during manual handling of materials 3. Foot injuries 4. Back injuries 15. Traffic 16. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 17. High Noise levels 18. Overhead hazards 19. Heat Stress/ Cold Stress 20. Eye Injuries	1. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 2. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery, or dirty objects before handling / Wear leather/ cut-resistant gloves 3. Wear Langan approved safety shoes 4. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 21. Wear high visibility clothing & vest / Use cones or signs to designate work area 22. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 23. Wear hearing protection 24. Wear hard hat / Avoid areas were overhead hazards exist. 25. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 26. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN	Job Safety Analysis (JSA) Health and Safety
JSA Title: Equipment Transportation and Set-up **JSA Number:** JSA012-01 **A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.**	 **S – *Stop,* what has changed?** **T – *Think* about the task** **E – *Evaluate* potential hazards** **P – *Plan* safe approach** **S - *Start* task / *Stop* & regroup**

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☐ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☐ Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
16. Transport equipment to work area	11. Back Strain 12. Slips/ Trips/ Falls 13. Traffic 14. Cuts/abrasions from equipment 15. Contusions from dropped equipment	1. Use proper lifting techniques / Use wheeled transport 2. Minimize distance to work area / Have unobstructed path to work area / Follow good housekeeping procedures 3. Wear proper PPE (high visibility vest or clothing) 4. Wear proper PPE (leather gloves, long sleeves) 5. Wear proper PPE (safety shoes)
17. Moving equipment to its planned location	6. Pinch Hazard 7. Slips/ Trips/ Falls	1. Wear proper PPE (leather gloves) 2. Be aware of potential trip hazards / Practice good housekeeping procedures / Mark significant below-grade hazards (i.e. holes, trenches) with safety cones or spray paint
18. Equipment Set-up	7. Pinch Hazard 8. Cuts/abrasions to knuckles/hands 9. Back Strain	1. Wear proper PPE (leather gloves) 2. Wear proper PPE (leather gloves) 3. Use proper lifting techniques / Use wheeled transport
19. All activities	21. Slips/ Trips/ Falls 22. Hand injuries, cuts, or lacerations during manual handling of materials 23. Foot injuries 24. Back injuries 25. Traffic 26. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.)	27. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 28. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 29. Wear Langan approved safety shoes

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
4. All activities (cont'd)	27. High Noise levels 28. Overhead hazards 29. Heat Stress/ Cold Stress 30. Eye Injuries	30. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 31. Wear high visibility clothing & vest / Use cones or signs to designate work area 32. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 33. Wear hearing protection 34. Wear hard hat / Avoid areas were overhead hazards exist. 35. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 36. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN	Job Safety Analysis (JSA) Health and Safety
JSA Title: 55-gallon Drum **Sampling** **JSA Number:** **JSA043-01**	 **S – *Stop,* what has changed?** **T – *Think* about the task** **E – *Evaluate* potential hazards** **P – *Plan* safe approach** **S - *Start* task / *Stop* & regroup**
A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.	

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☐ Hearing Protection
☒ Safety Glasses	☒ Safety Goggles	☒ Face Shield	☒ Nitrile Gloves	☒ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☒ Other: All Drums are required to be labeled. Langan employees do not open or move undocumented drums or unlabeled drums without proper project manager authorization.				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
20. Unpack/Transport equipment to work area.	16. Back Strains 17. Slip/Trips/Falls 18. Cuts/Abrasions from equipment 4. Contusions from dropped equipment	10. Use proper lifting techniques/Use wheeled transport 11. Minimize distance to work area/Unobstructed path to work area/follow good housekeeping procedures. Mark slip/trip/fall hazards with orange safety cones. 12. Wear proper PPE (leather gloves, long sleeves). 4. Wear proper PPE (Langan approved safety shoes).
21. Open Drums	1. Hand Injuries, cuts or lacerations when untightening drum locking bolt, removing drum lid strap, or removing lid. 2. Pressure from drums.	1. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery, or dirty objects before handling / Wear leather/ cut-resistant gloves. Use non-metallic mallet and non-sparking tools/wrenches. 2. Open drum slowly to relieve pressure. Wear proper PPE: face shield and goggles; correct gloves; and over garments.
22. Collecting Soil/Fluid Sample	8. Irritation to eye from vapor, soil dust, or splashing 9. Irritation to exposed skin	6. Wear proper eye protection including safety glasses/ face shield/googles and when necessary, splash guard. If dust or vapor phase is present, wear appropriate safety breathing gear (1/2 mask or full face mask with correct filter) 7. Wear proper skin protection including nitrile gloves.
23. Closing Drums	1. Hand Injuries, cuts or lacerations when untightening drum locking bolt, removing drum lid strap, or removing lid.	7. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery, or dirty objects before handling / Wear leather/ cut-resistant gloves. Use non-metallic mallet and non-sparking tools/wrenches.

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
24.Moving Drums	2. Hand Injuries, cuts or lacerations when untightening drum locking bolt, removing drum lid strap, or removing lid. 3. Back Strains	2. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery, or dirty objects before handling / Wear leather/ cut-resistant gloves. Use non-metallic mallet and non-sparking tools/wrenches. 3. Use proper lifting techniques/Use wheeled transport
25. All activities	31. Slips/ Trips/ Falls 32. Hand injuries, cuts, or lacerations during manual handling of materials 33. Foot injuries 34. Back injuries 35. Traffic 36. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 37. High Noise levels 38. Overhead hazards 39. Heat Stress/ Cold Stress 40. Eye Injuries	37. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 38. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 39. Wear Langan approved safety shoes 40. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 41. Wear high visibility clothing & vest / Use cones or signs to designate work area 42. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 43. Wear hearing protection 44. Wear hard hat / Avoid areas were overhead hazards exist. 45. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 46. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: Excavation Oversight
JSA Number: JSA041-01

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.

S – *Stop,* what has changed?
T – *Think* about the task
E – *Evaluate* potential hazards
P – *Plan* safe approach
S - *Start* task / *Stop* & regroup

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☒ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☐ Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
26. Transport equipment to work area	19. Back Strain 20. Slips/Trips/Falls 21. Traffic 22. Cuts/abrasions/contusions from equipment	13. Use proper lifting techniques / Use wheeled transport 14. Minimize distance to work area / Have unobstructed path to work area / Follow good housekeeping procedures 15. Wear proper PPE (high visibility vest or clothing) 16. Wear proper PPE (leather gloves, long sleeves, safety shoes)
27.Earth Moving Equipment	10. Equipment running over employee	8. Ensure you have direct line of sight with operator of equipment; do not walk behind equipment; maintain a safe distance away from equipment. 9. Wear proper PPE (high vis vest/clothing)
28.Excavation	10. Excavation collapse 11. Confined space 12. Soil	8. Use proper shoring/benching/sloping techniques; Ladder is properly situated in excavation; no water in excavation; competent person has inspected excavation prior to allow employees to enter. 9. Langan employees are not authorized to enter a confined space; 10. Soil and equipment is kept at least 2 feet from edge of excavation
29.Excavated soil	1. Hazardous substances	1. Use proper equipment to monitor excavated soil for contaminates; ensure levels do not exceed PEL's for contaminates; Wear proper PPE
30. All activities	41. Slips/ Trips/ Falls 42. Hand injuries, cuts, or lacerations during manual handling of materials 43. Foot injuries 44. Back injuries 45. Traffic 46. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.)	47. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 48. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 49. Wear proper PPE (Langan approved safety shoes)

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
	47. High Noise levels 48. Overhead hazards 49. Heat Stress/ Cold Stress 50. Eye Injuries	50. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 51. Wear high visibility clothing & vest / Use cones or signs to designate work area 52. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 53. Wear hearing protection 54. Wear hard hat / Avoid areas were overhead hazards exist. 55. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 56. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: General Construction Activities
JSA Number: JSA010-01

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☒ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☒ Traffic Cones/Signs	☐ Life Vest/Jacket	
☐ Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
31. Transport equipment to work area	23. Back Strain 24. Slips/ Trips/ Falls 25. Traffic 26. Cuts/abrasions from equipment 27. Contusions from dropped equipment	6. Use proper lifting techniques / Use wheeled transport 7. Minimize distance to work area / Have unobstructed path to work area / Follow good housekeeping procedures 8. Wear proper PPE (high visibility vest or clothing) 9. Wear proper PPE (leather gloves, long sleeves) 10. Wear proper PPE (safety shoes)
32. Installation of piping from vapor wells to skid connections and from discharge pipping to effluent stack	11. Pinch fingers when connecting pipes 12. Slips/ Trips/ Falls 13. Machinery Hazards	3. Wear proper PPE (leather gloves) 4. Be aware of potential trip hazards / Practice good housekeeping procedures / Mark significant below-grade hazards (i.e. holes, trenches) with safety cones or spray paint 5. Wear proper PPE (safety vest) / Maintain safe distance from operating machinery
33. Remediation equipment installation	13. Back strain when lifting heavy equipment 14. Slips/ Trips/ Falls 15. Traffic	5. Use proper lifting techniques / Use wheeled transport / Minimize distance to vehicle 6. Be aware of potential trip hazards / Practice good housekeeping procedures / Mark significant below-grade hazards (i.e. holes, trenches) with safety cones or spray pain 7. Wear proper PPE (safety vest)
34. All activities	51. Slips/ Trips/ Falls 52. Hand injuries, cuts, or lacerations during manual handling of materials 53. Foot injuries 54. Back injuries 55. Traffic	57. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 58. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 59. Wear Langan approved safety shoes

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
4. All activities (cont'd)	56. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 57. High Noise levels 58. Overhead hazards 59. Heat Stress/ Cold Stress 60. Eye Injuries	60. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 61. Wear high visibility clothing & vest / Use cones or signs to designate work area 62. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 63. Wear hearing protection 64. Wear hard hat / Avoid areas were overhead hazards exist. 65. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 66. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: **Site Inspection**
JSA Number: **JSA024-01**

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.

S – ***Stop,*** *what has changed?*

T – ***Think*** *about the task*

E – ***Evaluate*** *potential hazards*

P – ***Plan*** *safe approach*

S - ***Start*** *task /* ***Stop*** *& regroup*

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☒ Rubber Boots
☒ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☒ Traffic Cones/Signs	☐ Life Vest/Jacket	
☐ Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
35.Jobsite Pre-briefing	28.None	17. Review JSA, SOP's, and discuss hazards that may be present and control measures for present hazards while on-site.

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
2. Working near railroads	1. Passing Trains. 2. Slip/Trips/Falls.	1. Wear reflective vest/ Stay away from tracks/ Do not cross tracks within 10 ft. of train car or when there is a train within view/listen for train horn. 2. Be aware of tripping hazards/ Follow good housekeeping procedures/ Mark significant hazards with spray paint or cones.
3. Walking around site	4. Uneven terrain 5. Wildlife: Stray animals, mice/rats, vectors (i.e. mosquitoes, bees, etc.) 6. Weather: Heat/cold stress 7. Slip/Trips/Falls 8. Foot injuries 9. Eye injuries	4. Pay attention to surrounding area (puddles, wet, frozen, uneven areas); Mark with cones or spray paint. 5. Use bug spray/ Avoid stray animals/Use repellant when needed. 6. Dress for the correct weather situation/ Use sunscreen or protective clothing in sunlight, layers in cold weather/ Drink plenty of fluids/ Take breaks when needed. 4. Be aware of tripping hazards/ Follow good housekeeping procedures/ Mark significant hazards with spray paint or cones. 5. Wear proper PPE (Langan approved safety shoes)/ Change wet socks during cold weather. 6. Wear proper PPE (safety glasses/goggles).
4. Working near road	1. Passing vehicles 2. Slip/Trips/Falls	1. Wear reflective vest/ Stay away from roadway/ Use buddy system/ Place signage or cones when needed. 2. Be aware of tripping hazards/ Follow good housekeeping procedures/ Mark significant hazards with spray paint or cones.
5. All activities	61. Slips/ Trips/ Falls 62. Hand injuries, cuts, or lacerations during manual handling of materials 63. Foot injuries 64. Back injuries 65. Traffic 66. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 67. High Noise levels 68. Overhead hazards 69. Heat Stress/ Cold Stress 70. Eye Injuries	67. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 68. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 69. Wear Langan approved safety shoes 70. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 71. Wear high visibility clothing & vest / Use cones or signs to designate work area 72. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 73. Wear hearing protection 74. Wear hard hat / Avoid areas were overhead hazards exist. 75. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 76. Wear safety glasses
Additional items.		

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: **Building Construction Oversight**
JSA Number: **JSA006-01**

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.

S – ***Stop,*** *what has changed?*
T – ***Think*** *about the task*
E – ***Evaluate*** *potential hazards*
P – ***Plan*** *safe approach*
S - ***Start*** *task /* ***Stop*** *& regroup*

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☒ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☒ Traffic Cones/Signs	☐ Life Vest/Jacket	
☐ Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
36. Transport equipment to work area	29. Back Strain 30. Slips/ Trips/ Falls 31. Traffic 32. Cuts/abrasions from equipment 33. Contusions from dropped equipment	11. Use proper lifting techniques / Use wheeled transport 12. Minimize distance to work area / Have unobstructed path to work area / Follow good housekeeping procedures 13. Wear proper PPE (high visibility vest or clothing) 14. Wear proper PPE (leather gloves, long sleeves) 15. Wear proper PPE (safety shoes)
37. Drilling/anchor bolt installation	14. Hazards associated with drilling, flying objects, heavy equipment, ground level hazards and dust 15. Slips/ Trips/ Falls 16. Hazards associated with concrete work	6. Maintain a safe distance from drilling operation / Wear proper PPE (hard hat, safety glasses, safety shoes, safety vest) 7. Be aware of potential trip hazards / Follow good housekeeping procedures / Mark significant below-grade hazards (i.e. holes, trenches) with safety cones or spray paint / Wear the proper PPE (safety shoes) 8. Maintain a safe distance from pouring operation
38. Steel building erection	16. Overhead hazards, falling objects 17. Pinching/crushing hazards	8. Wear proper PPE (hard had, safety glasses, safety vest) / Be aware of overhead hazards and maintain a safe distance of at least 10 ft. 9. All personnel should make others aware of moving objects or their intent to move objects / Avoid areas where pinching and crushing hazards are possible
39. All activities	71. Slips/ Trips/ Falls 72. Hand injuries, cuts, or lacerations during manual handling of materials 73. Foot injuries 74. Back injuries 75. Traffic	77. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 78. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 79. Wear Langan approved safety shoes

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
4. All activities (cont'd)	76. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 77. High Noise levels 78. Overhead hazards 79. Heat Stress/ Cold Stress 80. Eye Injuries	80. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 81. Wear high visibility clothing & vest / Use cones or signs to designate work area 82. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 83. Wear hearing protection 84. Wear hard hat / Avoid areas were overhead hazards exist. 85. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 86. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: Direct-Push Soil Borings
JSA Number: JSA004-01

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.

S – ***Stop,*** *what has changed?*
T – ***Think*** *about the task*
E – ***Evaluate*** *potential hazards*
P – ***Plan*** *safe approach*
S - ***Start*** *task /* ***Stop*** *& regroup*

PERSONAL PROTECTIVE EQUIPMENT REQUIRED:				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☒ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☒ Other: Half-face respirator, dust cartridges, PID (if applicable)				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
40. Move equipment to work site	34. Back strain when lifting equipment 35. Slips/ Trips/ Falls while moving equipment 36. Traffic (if applicable) 37. Pinched fingers or running over toes during GeoProbe set-up 38. Overturn drilling rig while transporting to loading dock on flat-bed tow truck	18. Use proper lifting technique (use legs for bending and lifting and not the back)/ Use wheeled transport for heavy equipment / Get assistance when handling loads greater than 50 lbs. / Minimize distance to vehicle 19. Use proper lifting technique (use legs for bending and lifting and not the back) / Use wheeled transport for heavy equipment / Get assistance when handling loads greater than 50 lbs. / Minimize distance to vehicle / Have unobstructed path to vehicle or collection point / Do not lift/walk with boxes that are heavy/difficult to lift 20. Wear high visibility safety vests or clothing / Exercise caution 21. Wear proper PPE (cut-resistant gloves) / Stay alert, be aware of geoprobe rig at all times 22. Drill rig should be parked in center of flat-bed tow truck / Emergency brake shall be used at all times during transport on the flat-bed truck/ All unnecessary personnel should stay away from the flat-bed truck during moving activities
41. Calibration of monitoring equipment	17. Skin or eye contact with calibration chemicals 18. Pinch fingers in monitoring equipment	10. Wear proper PPE (safety glasses/ goggles) 11. Wear proper PPE (leather gloves)
42. Set-up GeoProbe rig	18. Geoprobe rig movement	11. All field personnel should stay clear of the GeoProbe rig while moving / Use a spotter when backing up the GeoProbe
43. Advance GeoProbe rods below ground surface to desired depth	10. Underground utilities 11. High noise levels	7. Clean all subsurface soil borings to a minimum of 5 feet below grade 8. Wear proper PPE (hearing protection)
44. Remove and open acetate liner	81. Pinched fingers while removing macrocore	1. Wear proper PPE (nitrile gloves, cut-resistant or leather gloves 2. Wear proper PPE (cut-resistant or leather gloves)

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
5. Remove and open acetate liner (cont'd)	82. Cuts/lacerations when cutting acetate liner open 83. Exposure to hazardous vapors 84. Skin contact with contaminated soil	3. Do not place face over acetate liner when opening / Monitor hazardous vapors in air with PID / Upgrade PPE as necessary based on levels contained in the Health and Safety Plan 4. Wear proper PPE (nitrile gloves)
45. Sample Collections a) Monitor parameters b) Prepare sample containers and labels	1. Contact with potentially contaminated soil 2. Lacerations from broken sample bottles 3. Back strain while transporting full coolers 4. Internal exposure to contaminants and metals through inhalation of dust 5. Slips/ Trips/ Falls	1. Use monitoring devices / Wear proper PPE (safety glasses, nitrile gloves) 2. Do not over-tighten bottle caps / Handle bottles safely to prevent breakage 9. Use proper lifting techniques / Do not lift heavy loads without assistance 10. Avoid creating dust / If necessary, wear a half mask respirator with applicable dust cartridge / Inspect respirator for damage and cleanliness prior to use / Clean respirator after each use and store in a clean, secure location 11. Be alert / Follow good housekeeping procedures
46. Remove excess soil from acetate liner and place in 55-gallon drum (IF NOT PERFORMED BY LANGAN, REMOVE!)	1. Cuts/lacerations from acetate liner 2. Pinched fingers/hand while opening/closing drum 3. Skin contact with contaminated soil 4. Soil debris in eyes	1. Wear proper PPE (cut-resistant or leather gloves) 2. Wear proper PPE (cut-resistant or leather gloves) 3. Wear proper PPE (nitrile gloves) 4. Wear proper PPE (safety glasses)

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
8. Transport drums to central staging location (IF NOT PERFORMED BY LANGAN, REMOVE!)	1. Back, arm or shoulder strain from moving drums	87. Use drum cart for moving drums / Use proper lifting techniques / Do not lift heavy loads without assistance
	2. Pinch fingers/hand in drum cart when moving drums	88. Wear proper PPE (cut-resistant or leather gloves)
	3. Pinch fingers/hand when operating lift-gate on vehicle	89. Wear proper PPE (cut-resistant or leather gloves)
	4. Contact with potentially contaminated groundwater when moving improperly sealed drums	90. Wear proper PPE (nitrile gloves underneath work gloves)
	5. Slips when moving drums	91. Follow good housekeeping procedures / Ensure route to move drum and storage space is free from obstructions
	6. Drop drum on feet/toes	92. Wear proper PPE (safety shoes) / Work in a safe manner to prevent dropped drum
9. All activities	1. Slips/ Trips/ Falls	1. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards
	2. Hand injuries, cuts, or lacerations during manual handling of materials	2. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves
	3. Foot injuries	3. Wear Langan approved safety shoes
	4. Back injuries	4. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible
	5. Traffic	5. Wear high visibility clothing & vest / Use cones or signs to designate work area
	6. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.)	6. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed
	7. High Noise levels	7. Wear hearing protection
	8. Overhead hazards	8. Wear hard hat / Avoid areas were overhead hazards exist.
	9. Heat Stress/ Cold Stress	9. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress
9. All activities (cont'd)	10. Eye Injuries	10. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date

Prepared by:		
Reviewed by:		

LANGAN	Job Safety Analysis (JSA) Health and Safety
JSA Title: Geophysical Investigation **JSA Number:** JSA023-01 **A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.**	 **S – Stop,** *what has changed?* **T** – ***Think*** *about the task* **E – *Evaluate*** *potential hazards* **P – *Plan*** *safe approach* **S - *Start*** *task / **Stop** & regroup*

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☒ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☐ Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
47. Transport equipment to work area	39. Back/strain 40. Slip/Trip/Falls 41. Traffic 42. Cuts/abrasions/contusions from equipment	23. Use proper lifting techniques/Use wheeled transport 24. Minimize distance to work area/unobstructed path to work area/follow good housekeeping procedures 25. Wear proper PPE (high visibility vest or clothing) 26. Wear proper PPE (leather gloves, long sleeves, Langan approved safety shoes)
48. Supervision of subcontractor and all other activities	19. Slip/Trips/Falls 20. Hand injuries 21. Foot injuries 22. Back injuries/Strains 23. Traffic 24. Wildlife a. Wildlife b. Mice/rats c. Vectors (i.e. mosquitoes, bees, etc.) 7. Heat/Cold Stress	12. Be aware of potential trip hazards/follow good housekeeping procedures/mark significant below-grade hazards (i.e. holes, trenches, wires, ropes) with safety cones or spray paint. 13. Wear proper PPE (leather gloves)/watch wear you place your hands/inspect material or equipment for jagged, rough, or slippery surfaces/ watch for pinch points/ wipe off slippery, wet, or dirty items prior to handling. 14. Wear proper PPE (Langan approved safety shoes)/ Be aware of uneven terrain) 15. Use proper lifting techniques/ Buddy system when lifting/ use wheeled transport. 16. Wear proper PPE (high-visibility shirts and vests)/ use cones if appropriate/ notify equipment operators of work area. 17. Be aware of surroundings at all times for the presence of wildlife. a. Do not approach stray animals b. Carry animal repellant/ use if situation arises. c. Use bug spray when needed. 7. Wear proper attire for weather conditions (sunscreen, protective clothing in

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
		sunlight or layer clothing in cold weather)/ drink plenty of fluids/ take regular breaks.
49. All activities	85. Slips/ Trips/ Falls 86. Hand injuries, cuts, or lacerations during manual handling of materials 87. Foot injuries 88. Back injuries 89. Traffic 90. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 91. High Noise levels 92. Overhead hazards 93. Heat Stress/ Cold Stress 94. Eye Injuries	93. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 94. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 95. Wear Langan approved safety shoes 96. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 97. Wear high visibility clothing & vest / Use cones or signs to designate work area 98. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 99. Wear proper hearing protection 100. Wear hard hat / Avoid areas were overhead hazards exist. 101. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 102. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: Groundwater Sampling
JSA Number: JSA008-01

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.

S – ***Stop,*** *what has changed?*
T – ***Think*** *about the task*
E – ***Evaluate*** *potential hazards*
P – ***Plan*** *safe approach*
S - ***Start*** *task /* ***Stop*** *& regroup*

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☒ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☒ Other: Tyvek sleeves, Dermal Protection, PID				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
50. Transport equipment to work area	1. Back Strain 2. Slips/ Trips/ Falls 3. Traffic 4. Cuts/abrasions from equipment 5. Contusions from dropped equipment	1. Use proper lifting techniques / Use wheeled transport 2. Minimize distance to work area / Have unobstructed path to work area / Follow good housekeeping procedures 3. Wear proper PPE (high visibility vest or clothing) 4. Wear proper PPE (leather gloves, long sleeves) 5. Wear proper PPE (safety shoes)
51. Remove well cover	25. Scrape knuckles/hand 26. Strain wrist/bruise palm 27. Pinch fingers or hand	9. Wear proper PPE (leather gloves) 10. Using a hammer, tap the end of the wrench to loosen grip of bolts 11. Wear proper PPE (leather gloves)
52. Remove well cap and lock	19. Well can pops from pressure 20. Exposure to hazardous substances through inhalation or dermal exposure 21. Scrape knuckles/hand 22. Strain write/bruise palm	10. Remove cap slowly to relieve pressure / Do not place face over well when opening / Wear proper PPE (safety glasses) 11. Use direct air monitoring/reading instrument (i.e. PID) / Be familiar with and follow actions prescribed in the HASP / Wear proper PPE (nitrile gloves) 12. Wear proper PPE (leather gloves) 13. Using hammer, tap the end of the wrench to loosen grip
53. Measure head-space vapor levels	1. Exposure to hazardous substances through inhalation	1. Do not place face over well when collecting measurement
54. Remove dedicated tubing (if necessary)	1. Exposure to hazardous substances through inhalation or dermal exposure 2. Tubing swings around after removal	1. Wear proper PPE (nitrile gloves, Tyvek sleeves) 2. Wear proper PPE (safety glasses)
55. Set-up plastic sheeting for work site around the well	1. Lacerations when cutting plastic sheeting	1. Use scissors to cut plastic sheeting / Cut motions should always be away from body and body parts

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
56. Measure depth to water	1. Exposure to hazardous substances through inhalation or dermal exposure 2. Pinch fingers or hand in water level instrument	1. Wear proper PPE (nitrile gloves) 2. Wear proper PPE (leather gloves)
57. Calibrate monitoring equipment	1. Skin or eye contact with calibration chemicals 2. Pinch fingers or hand in monitoring equipment	1. Wear proper PPE (safety glasses, nitrile gloves) 2. Wear proper PPE (leather gloves) / Avoid pinch points
58. Install sampling pump in well	1. Hand injuries during installation of pump 2. Lacerations when cutting tubing 3. Back strain during installation of pump 4. Physical hazards associated with manual lifting of heavy equipment 5. Back strain from starting generator 6. Burns from hot exhaust from generator 7. Electrical shock from improper use of generator and pump 8. Contaminated water spray from loose connections	1. Wear proper PPE (leather gloves, nitrile gloves) 2. Use safety tubing cutter 3. Use proper lifting techniques 4. Use proper lifting techniques / Use wheeled transport for heavy equipment 5. Use arm when starting generator / Do not over-strain if generator does not start 6. Do not touch generator near exhaust / Use proper handle to carry / Allow generator to cool down before moving 7. Properly plug in pump to generator / Do not allow the pump or generator to contact water / Check for breaks in the cord 8. Check all tubing connections to ensure they are tight and secure

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
10. Purge water	1. Contact with potentially contaminated groundwater 2. Back strain from lifting buckets of water 3. Tripping potential on sample discharge lines and pump electric line	1. Wear proper PPE (safety glasses, nitrile gloves) 2. Use proper lifting techniques / Use wheeled transport 3. Organize discharge of electric line to keep out of way as much as possible / Mark potential tripping hazards with caution tape or safety cones
11. Sample water collection	1. Contact with potentially contaminated groundwater through dermal exposure 2. Contact with and burns from acid used for sample preservation 3. Tripping potential on sample discharge lines and pump electric line 4. Lacerations from broken sample bottles 5. Back strain when transporting coolers full of collected samples 6. Slips/ Trips/ Falls	1. Wear proper PPE (safety glasses, nitrile gloves) 2. Wear proper PPE (safety glasses, nitrile gloves) / Ensure sample bottle lids are secure before use and after sample collection 3. Organize line to keep out of the way as much as possible / Mark potential tripping hazards with caution tape or safety cones 4. Do not over-tighten bottle caps / Handle bottles safely to prevent breakage / Wrap glass bottles in bubble wrap, if possible 5. Use proper lifting techniques / Use wheeled transport / Seek assistance if coolers weight exceeds 50lbs. / Minimize distance to vehicle 6. Have unobstructed path to vehicle or collection point / Follow good housekeeping procedures / Do not lift/walk with coolers that are too heavy/difficult to lift
12. Remove pump and pack up equipment	1. Back strain when removing pump or lifting heavy equipment	1. Use proper lifting technique / Use wheeled transport for heavy equipment
13. Replace well cap and lock	1. Scrape fingers/hand 2. Strain wrist/bruise palm	1. Wear proper PPE (leather gloves) 2. Using hammer, tap the end of the well cap to tighten grip
14. Replace well cover	1. Scrape knuckles/hand 2. Strain write/bruise palm 3. Pinch fingers or hand	1. Wear proper PPE (leather gloves) 2. Using hammer, tap the end of the wrench to tighten the grip of the bolts 3. Wear proper PPE (leather gloves)
15. Transport drums to disposal staging location	1. Back, arm or shoulder strain from moving drums 2. Pinch hazard 3. Contact with potentially contaminated groundwater when moving improperly sealed drums 4. Slips/ Trips/ Falls when moving drum 5. Drop drum on feet/toes	1. Use drum cart for moving drums / Use proper lifting techniques / Obtain assistance, if needed 2. Wear proper PPE (leather gloves) 3. Wear proper PPE (nitrile gloves under leather gloves) / Properly seal drum to prevent leak 4. Ensure route to move drum to storage space is dry and free from obstructions 5. Wear proper PPE (safety shoes)
16. Place used PPE in designated disposal drum	1. Pressure build-up inside drum 2. Pinch hazard	1. Remove cap from bung hole in drum to relieve pressure 2. Wear proper PPE (leather gloves)
17. Decontaminate equipment	1. Splashing water/soap from decontamination 2. Contact with potentially contaminated groundwater through dermal exposure 3. Electrical shock from broken electric cords	1. Wear proper PPE (safety glasses) 2. Wear proper PPE (safety glasses, dermal protection) 3. Properly plug in pump to generator / Do not allow the pump or generator to contact water / Check for breaks in the cord
18. All activities	95. Slips/ Trips/ Falls 96. Hand injuries, cuts, or lacerations during manual handling of materials 97. Foot injuries 98. Back injuries 99. Traffic 100. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.)	103. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 104. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 105. Wear Langan approved safety shoes

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
	101. High Noise levels 102. Overhead hazards 103. Heat Stress/ Cold Stress 104. Eye Injuries	106. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 107. Wear high visibility clothing & vest / Use cones or signs to designate work area 108. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 109. Wear hearing protection 110. Wear hard hat / Avoid areas were overhead hazards exist. 111. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 112. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	**Sign Name**	**Date**
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: **Well Installation**
JSA Number: **JSA019-01**

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.

S – *Stop,* what has changed?
T – *Think* about the task
E – *Evaluate* potential hazards
P – *Plan* safe approach
S - *Start* task / *Stop* & regroup

PERSONAL PROTECTIVE EQUIPMENT REQUIRED:				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☒ Other: PID, Tyvek sleeves				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
59. Move equipment to work site	43. Back strain when lifting equipment 44. Slips/ Trips/ Falls while moving equipment 45. Traffic (if applicable) 46. Pinched fingers or running over toes during GeoProbe set-up 47. Overturn drilling rig while transporting to loading dock on flat-bed tow truck	27. Use proper lifting technique (use legs for bending and lifting and not the back)/ Use wheeled transport for heavy equipment / Get assistance when handling loads greater than 50 lbs. / Minimize distance to vehicle 28. Use proper lifting technique (use legs for bending and lifting and not the back) / Use wheeled transport for heavy equipment / Get assistance when handling loads greater than 50 lbs. / Minimize distance to vehicle / Have unobstructed path to vehicle or collection point / Do not lift/walk with boxes that are heavy/difficult to lift 29. Wear high visibility safety vests or clothing / Exercise caution 30. Wear proper PPE (cut-resistant gloves) / Stay alert, be aware of geoprobe rig at all times 31. Drill rig should be parked in center of flat-bed tow truck / Emergency brake shall be used at all times during transport on the flat-bed truck/ All unnecessary personnel should stay away from the flat-bed truck during moving activities
60. Calibration of monitoring equipment	28. Skin or eye contact with calibration chemicals 29. Pinch fingers in monitoring equipment	18. Wear proper PPE (safety glasses/ goggles) 19. Wear proper PPE (leather gloves)
20. Set-up GeoProbe rig	23. Geoprobe rig movement	12. All field personnel should stay clear of the GeoProbe rig while moving / Use a spotter when backing up the GeoProbe
21. Advance GeoProbe rods below ground surface to desired depth	12. Underground utilities 13. High noise levels	12. Clean all subsurface soil borings to a minimum of 5 feet below grade 13. Wear proper PPE (hearing protection)

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
22. Remove and open acetate liner 5. Remove and open acetate liner (cont'd)	105. Pinched fingers while removing macrocore 106. Cuts/lacerations when cutting acetate liner open 107. Exposure to hazardous vapors 108. Skin contact with contaminated soil	5. Wear proper PPE (nitrile gloves, cut-resistant or leather gloves 6. Wear proper PPE (cut-resistant or leather gloves) 7. Do not place face over acetate liner when opening / Monitor hazardous vapors in air with PID / Upgrade PPE as necessary based on levels contained in the Health and Safety Plan 8. Wear proper PPE (nitrile gloves)
6. Remove excess soil from acetate liner and place in 55-gallon drum (IF NOT PERFORMED BY LANGAN, REMOVE!)	5. Cuts/lacerations from acetate liner 6. Pinched fingers/hand while opening/closing drum 7. Skin contact with contaminated soil 8. Soil debris in eyes	5. Wear proper PPE (cut-resistant or leather gloves) 6. Wear proper PPE (cut-resistant or leather gloves) 7. Wear proper PPE (nitrile gloves) 8. Wear proper PPE (safety glasses)
7. Attach hollow-stem augers to the GeoProbe rig; Advance augers and attach additional augers until desired depth is reached	1. Strain wrist/bruise palm 2. Pinched fingers 3. Back Strain 4. Clothing entanglement 5. Carbon monoxide poisoning 6. Bruise toes/foot 7. High noise levels 8. Skin contact with contaminated soil	1. Wear proper PPE (cut-resistant or leather gloves) 2. Wear proper PPE (cut-resistant or leather gloves) 3. Use proper lifting techniques 4. Wear proper work attire(no loose clothing/strings) 5. Properly ventilate work area 6. Wear proper PPE (safety shoes) 7. Wear proper PPE (hearing protection) 8. Wear proper PPE (Tyvek sleeves, nitrile gloves)
8. Install monitoring well	1. Pinched fingers 2. Lacerations/abrasions 3. Back Strain	1. Wear proper PPE (cut-resistant or leather gloves) 2. Wear proper PPE (cut-resistant or leather gloves) 3. Use proper lifting techniques
9. Tremie-grout annulus space above bentonite seal	1. Back strain 2. Pinched fingers	1. Use proper lifting techniques 2. Wear proper PPE (cut-resistant or leather gloves)
10. Install flush-mount monitoring well pad	1. Splashed concrete 2. Pinched fingers 3. Cuts/lacerations	1. Wear proper PPE (safety glasses) 2. Wear proper PPE (cut-resistant or leather gloves) 3. Wear proper PPE (cut-resistant or leather gloves)
11. Decontaminate equipment	1. Splashing water/soap 2. Contact with potentially contaminated groundwater/soil through dermal exposure 3. Electrical shock from broken electric cords	1. Wear proper PPE (safety glasses) 2. Wear proper PPE (safety glasses, dermal protection) 3. Properly plug in pump to generator / Do not allow the pump or generator to contact water / Check for breaks in the cord
12. Transport drums to central staging location (IF NOT PERFORMED BY LANGAN, REMOVE!)	7. Back, arm or shoulder strain from moving drums 8. Pinch fingers/hand in drum cart when moving drums 9. Pinch fingers/hand when operating lift-gate on vehicle 10. Contact with potentially contaminated groundwater when moving improperly sealed drums 11. Slips when moving drums 12. Drop drum on feet/toes	113. Use drum cart for moving drums / Use proper lifting techniques / Do not lift heavy loads without assistance 114. Wear proper PPE (cut-resistant or leather gloves) 115. Wear proper PPE (cut-resistant or leather gloves) 116. Wear proper PPE (nitrile gloves underneath work gloves) 117. Follow good housekeeping procedures / Ensure route to move drum and storage space is free from obstructions 118. Wear proper PPE (safety shoes) / Work in a safe manner to prevent dropped drum

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
13. All activities 13. All activities (cont'd)	11. Slips/ Trips/ Falls 12. Hand injuries, cuts, or lacerations during manual handling of materials 13. Foot injuries 14. Back injuries 15. Traffic 16. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 17. High Noise levels 18. Overhead hazards 19. Heat Stress/ Cold Stress 20. Eye Injuries	11. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 12. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 13. Wear Langan approved safety shoes 14. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 15. Wear high visibility clothing & vest / Use cones or signs to designate work area 16. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 17. Wear hearing protection 18. Wear hard hat / Avoid areas were overhead hazards exist. 19. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 20. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: **Monitoring Well Development**
JSA Number: **JSA026-01**

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.

S – ***Stop,*** *what has changed?*
T – ***Think*** *about the task*
E – ***Evaluate*** *potential hazards*
P – ***Plan*** *safe approach*
S - ***Start*** *task /* ***Stop*** *& regroup*

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☐ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☒ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☒ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☒ Other: Tyvek Sleeves				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
61. Transport equipment to work area	48. Back Strains 49. Slips/Trips/Falls 50. Traffic 51. Cuts/Abrasions/Contusions from equipment	32. Use proper lifting techniques/ Use wheeled transport/ use buddy system when lifting equipment. 33. Minimize distance from work area/ unobstructed path to collection points and vehicle/ Follow good housekeeping procedures. 34. Wear high-visibility vest or clothing/Exercise caution/ Use traffic cones or signage if needed. 35. Wear proper PPE (leather gloves, long sleeves, Langan approved safety shoes).
62. Measure depth of water	30. Exposure to hazardous substances 31. Pinched fingers	23. Wear proper PPE (Nitrile gloves, Safety glasses/Face shield). 24. Wear proper PPE (cut-resistant gloves).
63. Install Tremie pipe in the monitoring well and connect to water source.	24. Hand injuries during installation (pinched fingers/hands). 25. Back strain from holding Tremie pipe. 26. High pressure water spray.	13. Wear proper PPE (Nitrile gloves/cut-resistant gloves). 14. Use proper lifting techniques/ Use two personnel when lowering pump greater than 80 feet. 15. Ensure all hose connections are tight and secure/ Use proper PPE (face shield and safety glasses).
64. Install pump in to well. a. Connect pump to sample tubing. b. Lower pump to desired depth in well. c. Connect sample tubing to flow cell. d. Connect pump to power source	14. Hand injuries during pump installation and sample tubing cutting. 15. Back strain 16. Electric shock 17. Exhaust gases from generator 18. Burns from hot equipment	14. Wear proper PPE when installing pump and cutting sample tubing (Nitrile and cut-resistant gloves)/ Use tubing cutter. 15. Proper lifting techniques/ Two personnel when installing pump at depths greater than 80 feet/ Use buddy when lifting heavy loads (pump, generator)/Use wheeled transport. 16. Ensure equipment is (LO/TO: locked out/tagged out) prior to preforming any electrical connections/ Inspect wires for frays or cuts/Ensure generator is properly grounded prior to starting.

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
(generator) e. Turn on power source (generator)		17. Position generator so that exhaust is flowing away from work area. 18. Do not touch exhaust or any hot part of generator/ Allow equipment time to cool down prior to carrying/ Use proper PPE (long sleeves, leather gloves)
65. Develop monitoring well. a. Jet water into well using Tremie pipe. b. Turn pump on and adjust to desired flow rate. c. Surge pump up and down well to remove sediment from screen. d. Containerize all purge water from well.	109. Hand injuries 110. Face injuries 111. Contaminated spray from water	119. Wear proper PPE (cut-resistant gloves and nitrile gloves). 120. Wear proper PPE (face shield and safety glasses)/do not stand over well opening. 121. Wear proper PPE (Face shield and safety goggles)/Tyvek over garments/ Ensure all connections are secure and tight/ Tubing outlet is contained in an overflow container.
66. Drum staging area.	1. Back, Arm, and shoulder strain. 2. Pinch points 3. Cross contamination 4. Slip/Trips/Falls	1. Use proper lifting techniques/ Use drum carts when moving drums/ use buddy system for moving of drums if needed/Move drums shortest distance needed. 2. Keep fingers and feet away from pinch points/ Use proper PPE (cut-resistant gloves, Langan approved safety shoes) 3. Use proper PPE (Nitrile gloves, Tyvek sleeves) 4. Ensure pathway is clear prior to moving equipment/ Mark all hazards/ Use additional person as a spotter if needed.
67. Equipment pack-up	1. Back Strains 2. Slips/Trips/Falls 3. Traffic 4. Cuts/Abrasions/Contusions from equipment.	1. Use proper lifting techniques/ Use wheeled transport/ use buddy system when lifting equipment. 2. Minimize distance from work area/ Unobstructed path to collection points and vehicle/ Follow good housekeeping procedures. 3. Wear high-visibility vest or clothing/Exercise caution/ Use traffic cones or signage if needed. 122. Wear proper PPE (leather gloves, long sleeves, Langan approved safety shoes).
68. All activities	1. Slips/ Trips/ Falls 2. Hand injuries, cuts, or lacerations during manual handling of materials 3. Foot injuries 112. Back injuries 113. Traffic 114. Wildlife: Stray dogs, Mice/rats, Vectors (i.e., mosquitoes, bees, etc.) 115. High Noise levels 116. Overhead hazards 117. Heat Stress/ Cold Stress 118. Eye Injuries	1. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 2. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery, or dirty objects before handling / Wear leather/ cut-resistant gloves 3. Wear Langan approved safety shoes 4. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 5. Wear high visibility clothing & vest / Use cones or signs to designate work area 6. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 7. Wear hearing protection 8. Wear hard hat / Avoid areas where overhead hazards exist. 9. Wear proper attire for weather conditions (sunscreen or protective clothing

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
		in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 10. Wear safety glasses.
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: **Groundwater/Product Purging/Sampling with Bailer**
JSA Number: **JSA053**

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last-Minute Risk Assessment.

S – ***Stop,*** *what has changed?*
T – ***Think*** *about the task*
E – ***Evaluate*** *potential hazards*
P – ***Plan*** *safe approach*
S - ***Start*** *task /* ***Stop*** *& regroup*

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☒ Safety Goggles	☒ Face Shield	☒ Nitrile Gloves	☒ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☒ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☒ Traffic Cones/Signs	☐ Life Vest/Jacket	
☒ Other: Tyvek sleeves, Dermal Protection, PID, absorbent pads				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
69. Transport equipment to work area	6. Back Strain 7. Slips/ Trips/ Falls 8. Traffic 9. Cuts/abrasions from equipment 10. Contusions from dropped equipment	6. Use proper lifting techniques / Use wheeled transport. 7. Minimize distance to work area / Have unobstructed path to work area / Follow good housekeeping procedures. 8. Wear proper PPE (high visibility vest or clothing) 9. Wear proper PPE (leather gloves, long sleeves) 10. Wear proper PPE (safety shoes)
70. Remove well cover	32. Scrape knuckles/hand 33. Strain wrist/bruise plan 34. Pinch fingers or hand	12. Wear proper PPE (leather gloves) 13. Using a hammer, tap the end of the wrench to loosen grip of bolts. 14. Wear proper PPE (leather gloves)
71. Remove well cap and lock	27. Well can pops from pressure. 28. Exposure to hazardous substances through inhalation or dermal exposure 29. Scrape knuckles/hand 30. Pinch points 31. Strain write/bruise palm	14. Remove cap slowly to relieve pressure / Do not place face over well when opening / Wear proper PPE (safety glasses, face shield, hand protection) 15. Use direct air monitoring/reading instrument (i.e., PID) / Be familiar with and follow actions prescribed in the HASP / Wear proper PPE (nitrile gloves) 16. Wear proper PPE (leather gloves) 17. Using hammer, tap the end of the wrench to loosen grip
72. Measure head-space vapor levels	2. Exposure to hazardous substances through inhalation	2. Do not place face over well when collecting measurement
73. Set-up plastic sheeting/absorbent pads	2. Lacerations when cutting plastic sheeting/absorbent pads.	2. Use scissors to cut plastic sheeting/absorbent pads / Cut motions should always be away from body and body parts

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
for work site around the well		
74. Lower Bailer sleeve into well	7. Repetitive motion injury (pulled arm/back muscles) 8. Dehydration	7. Take breaks while lowering bailer into well/ Use a mechanical device to lower bailer into well/ Rotate employees (take turns conducting the manual labor portion) 8. Take breaks and drink water.

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
7. Purge/Sample water/product collection	1. Contact with potentially contaminated groundwater or product through dermal exposure 2. Contact with and burns from acid used for sample preservation 9. Tripping potential on sampling lanyard 10. Lacerations from broken sample bottles 11. Back strain when transporting coolers full of collected samples. 12. Slips/ Trips/ Falls	1. Wear proper PPE (safety glasses, nitrile gloves, safety shield, Tyvek) 2. Ensure sample bottle lids are secure before use and after sample collection 3. Organize lanyard to keep out of the way as much as possible / Mark potential tripping hazards with caution tape or safety cones 9. Do not over-tighten bottle caps / Handle bottles safely to prevent breakage / Wrap glass bottles in bubble wrap, if possible 10. Use proper lifting techniques / Use wheeled transport / Seek assistance if coolers weight exceeds 50lbs. / Minimize distance to vehicle. 11. Have unobstructed path to vehicle or collection point / Follow good housekeeping procedures / Do not lift/walk with coolers that are too heavy/difficult to lift
8. Retrieval of bailer	9. Repetitive motion injury (pulled arm/back muscles) 10. Dehydration	9. Take breaks while retrieving bailer out of the well/ Use a mechanical device to raise bailer out of well/ Rotate employees (take turns conducting the manual labor portion) 10. Take breaks and drink water.
9. Pack-up equipment	2. Back strain when removing or lifting heavy equipment	2. Use proper lifting technique / Use wheeled transport for heavy equipment
10. Replace well cap and lock	3. Scrape fingers/hand 4. Strain wrist/bruise palm	3. Wear proper PPE (leather gloves) 4. Using hammer, tap the end of the well cap to tighten grip
11. Replace well cover	4. Scrape knuckles/hand 5. Strain write/bruise palm. 6. Pinch fingers or hand	4. Wear proper PPE (leather gloves) 5. Using hammer, tap the end of the wrench to tighten the grip of the bolts. 6. Wear proper PPE (leather gloves)
12. Place used PPE in designated disposal drum	3. Pressure build-up inside drum 4. Pinch hazard	3. Remove cap from bung hole in drum to relieve pressure. 4. Wear proper PPE (leather gloves) 5. Product drums may require additional spill protection/electrical grounding, check local regulations
13. Decontaminate equipment	4. Splashing water/soap from decontamination 5. Contact with potentially contaminated groundwater through dermal exposure.	4. Wear proper PPE (safety glasses) 5. Wear proper PPE (safety glasses, dermal protection)

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
14. All activities	119. Slips/ Trips/ Falls 120. Hand injuries, cuts, or lacerations during manual handling of materials 121. Foot injuries 122. Back injuries 123. Traffic 124. Wildlife: Stray dogs, Mice/rats, Vectors (i.e., mosquitoes, bees, etc.) 125. High Noise levels 126. Overhead hazards 127. Heat Stress/ Cold Stress 128. Eye Injuries	123. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards. 124. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery, or dirty objects before handling / Wear leather/ cut-resistant gloves. 125. Wear Langan approved safety shoes. 126. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible. 127. Wear high visibility clothing & vest / Use cones or signs to designate work area. 128. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed. 129. Wear hearing protection 130. Wear hard hat / Avoid areas where overhead hazards exist. 131. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress. 132. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: **Test Pits**
JSA Number: **JSA016-01**

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.

S – *Stop,* what has changed?
T – *Think* about the task
E – *Evaluate* potential hazards
P – *Plan* safe approach
S - *Start* task / *Stop* & regroup

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☐ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☐ Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
75. Transport equipment to work area	52. Back Strain 53. Slips/ Trips/ Falls 54. Traffic 55. Cuts/abrasions from equipment 56. Contusions from dropped equipment	16. Use proper lifting techniques / Use wheeled transport 17. Minimize distance to work area / Have unobstructed path to work area / Follow good housekeeping procedures 18. Wear proper PPE (high visibility vest or clothing) 19. Wear proper PPE (leather gloves, long sleeves) 20. Wear proper PPE (safety shoes)
76. Digging Test Pit	35. Back Strain 36. Unstable walls of excavation	15. Observe proper digging technique. Ensure spoil pile and equipment are at least 2 feet from edge of excavation. 16. Excavate test pit in a stepped manor.
77. All activities	129. Slips/ Trips/ Falls 130. Hand injuries, cuts, or lacerations during manual handling of materials 131. Foot injuries 132. Back injuries 133. Traffic 134. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 135. High Noise levels 136. Overhead hazards 137. Heat Stress/ Cold Stress 138. Eye Injuries	133. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 134. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 135. Wear Langan approved safety shoes 136. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 137. Wear high visibility clothing & vest / Use cones or signs to designate work area 138. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
3. All activities (cont'd)		139. Wear hearing protection 140. Wear hard hat / Avoid areas were overhead hazards exist. 141. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 142. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

ATTACHMENT H

TAILGATE SAFETY BRIEFING FORM

LANGAN TAILGATE SAFETY BRIEFING

Date:_____ Time: _____

Leader:_____ Location:_____

Work Task:

_____

_____

SAFETY TOPICS (*provide some detail of discussion points*)

Chemical Exposure Hazards and Control:_____

_____

Physical Hazards and Control: _____

Air Monitoring: _____

PPE: _____

_____

Communications:_____

Safe Work Practices: _____

_____

Emergency Response: _____

Hospital/Medical Center Location: _____

Phone Nos.: _____

Other: _____

FOR FOLLOW-UP (the issues, responsibilities, due dates, etc.**)**

_____

_____

_____

ATTENDEES

PRINT NAME	COMPANY	SIGNATURE

ATTACHMENT I

THE CITY OF NEW YORKEXECUTIVE ORDER NO. 74

Langan employees and their direct hire contractors will comply with all provisions of the New York City Executive Order No. 74 as signed by the Mayor on July 31, 2021. Specifically, effective August 2, 2021

- Will don face masks while on-site at all times; and
- Provide proof upon demand of full vaccination status.

A copy of the New York City Executive Order No. 74 is provided on the following pages.

APPENDIX E

Quality Assurance Project Plan

QUALITY ASSURANCE PROJECT PLAN

FOR

WILLETS POINT DEVELOPMENT L-PARCEL

126th STREET/WILLETS POINT BOULEVARD
QUEENS, NEW YORK
NYSDEC BCP Site No. C241146H

Prepared for

Queens Development Group, LLC
QDG Hotel Partners, LLC
QDG 126th Street Partners, LLC
QDG Parking Partners, LLC
QDG Retail Partners, LLC
Willets Point Phase I Owner, LLC
Willets Point Phase I LIHTC Owner, L.P.
c/o The Related Companies
30 Hudson Yards
New York, New York 10001

Prepared by:

Langan Engineering, Environmental, Surveying
Landscape Architecture and Geology, D.P.C.
368 Ninth Avenue, 8th Floor
New York, New York 10001

June 2026

Langan Project No: 170197605

LANGAN

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1.0 PROJECT DESCRIPTION

1.1 Introduction

This Quality Assurance Project Plan (QAPP) was prepared on behalf of The Queens Development Group, LLC (QDG); QDG Hotel Partners, LLC; QDG 126th Street Partners, LLC; QDG Parking Partners, LLC; and QDG Retail Partners, LLC (collectively, the Volunteer) for the property known as the overall Willets Point Development Brownfield Cleanup Program (BCP) Site. The Volunteer entered into the New York State Department of Environmental Conservation (NYSDEC) BCP (BCP Site No. C241146) under the December 16, 2013 Brownfield Cleanup Agreement (BCA) (Index No. C241146-X-X). The BCA was amended on July 14, 2014 to increase the BCP Site size by 5.6 acres and includes the addition of 14 tax lots and 3 partial roadways, and the removal of 3 tax lots and 2 partial roadways. A second BCA amendment was issued on September 23, 2014 to add language related to an Independent Environmental Monitor that was omitted from the original BCA. A third BCA amendment was executed on June 10, 2020 to account for the 2015 changes to the BCP legislation. A fourth amendment to the BCA, dated August 28, 2023, divided the 22.868-acre Willets Point Development BCP Site into eight separate sites (BCP Site Nos. C241146 and C241146B through C241146H).

This QAPP was prepared for the Site which is 1.120 acres and is comprised of Queens Borough Tax Block 1833, Lots 158 and 172. This QAPP specifies the sampling procedures to be followed and the analytical methods to be used to ensure that data from the proposed investigation are precise, accurate, representative, comparable, and complete.

1.2 Project Objectives

Future site renovations and improvements or new construction requiring the disturbance, excavation, and/or off-site removal of soil, vapor, or groundwater may warrant the collection and analysis of soil, vapor, and groundwater samples in accordance with the Excavation Work Plan (EWP) included in Appendix D of the SMP, and NYSDEC Divisions of Environmental Remediation (DER)-10: Technical Guidance for Site Investigation and Remediation. Accordingly, this QAPP addresses sampling and analytical methods that may be necessary in support of future improvements or proposed modifications to the SMP. These objectives have been established to meet standards that will protect public health and the environment for the Site.

1.3 Scope of Work

The specific scope of work covered in this QAPP includes any future intrusive work at the Site that may be conducted and any site activities covered under the SMP. The SMP governs future activities relative to the Site which may include soil, groundwater, or vapor sampling.

2.0 DATA QUALITY OBJECTIVES AND PROCESSES

Data Quality Objectives (DQOs) are qualitative and quantitative statements to help ensure that data of known and appropriate quality are obtained during the project. The sampling program will provide for collection of soil, soil vapor, indoor air, or groundwater samples as part of a future need for sampling. DQOs for sampling activities are determined by evaluating five factors:

- Data needs and uses: The types of data required and how the data will be used after it is obtained.
- Parameters of Interest: The types of chemical or physical parameters required for the intended use.
- Level of Concern: Levels of constituents, which may require remedial actions or further investigations.
- Required Analytical Level: The level of data quality, data precision, and QA/QC documentation required for chemical analysis.
- Required Detection Limits: The detection limits necessary based on the above information.

The quality assurance and quality control objectives for all measurement data include:

- **Precision** – an expression of the reproducibility of measurements of the same parameter under a given set of conditions. Field sampling precision will be determined by analyzing coded duplicate samples and analytical precision will be determined by analyzing internal QC duplicates and/or matrix spike duplicates.
- **Accuracy** – a measure of the degree of agreement of a measured value with the true or expected value of the quantity of concern. For soil and groundwater samples, accuracy will be determined through the assessment of the analytical results of field blanks and trip blanks for each sample set. Analytical accuracy will be assessed by examining the percent recoveries of surrogate compounds that are added to each sample (organic analyses only), internal standards, laboratory method blanks, instrument calibration, and the percent recoveries of matrix spike compounds added to selected samples and laboratory blanks.

  For soil vapor or air samples, analytical accuracy will be assessed by examining the percent recoveries that are added to each sample, internal standards, laboratory method blanks, and instrument calibration.
- **Representativeness** – expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is dependent upon the adequate design of the sampling program and will be satisfied by ensuring that the scope of work is followed and that specified sampling and analysis techniques are used. Representativeness in the laboratory is ensured by compliance to nationally-recognized

analytical methods, meeting sample holding times, and maintaining sample integrity while the samples are in the laboratory's possession. This is accomplished by following all applicable methods, laboratory-issued standard operating procedures (SOPs), the laboratory's Quality Assurance Manual, and this QAPP. The laboratory is required to be properly certified and accredited.

- **Completeness** – the percentage of measurements made which are judged to be valid. Completeness will be assessed through data validation. The QC objective for completeness is generation of valid data for at least 90 percent of the analyses requested.
- **Comparability** – expresses the degree of confidence with which one data set can be compared to another. The comparability of all data collected for this project will be ensured using several procedures, including standard methods for sampling and analysis as documented in the QAPP, using standard reporting units and reporting formats, and data validation.
- **Sensitivity** – the ability of the instrument or method to detect target analytes at the levels of interest. The project manager will select, with input from the laboratory and QA personnel, sampling and analytical procedures that achieve the required levels of detection.

3.0 PROJECT ORGANIZATION

Any future remedial activities and investigations will be overseen by Langan or another environmental consultant for the Volunteers or a future owner. The environmental consultant will also arrange data analysis for reporting tasks. The analytical services will be performed by an ELAP-certified laboratory. Data validation services will be performed by approved data validation contractor(s). Sampling will be conducted by Langan and the analytical services will be performed by Alpha Analytical Laboratories, Inc. of Westborough, Massachusetts (NYSDOH ELAP certification number 11148) and/or York Analytical Laboratories, Inc. of Stratford, Connecticut (NYSDOH ELAP certification number 10854). Data validation services will be performed by Joseph Conboy; resume attached (Attachment B).

Soil sampling is not anticipated during implementation of the SMP. Soil samples may be collected during future invasive/excavation activities to assess potential impacts from contaminant source, waste characterization sampling, and health and safety monitoring.

Key contacts for this project are summarized below; Langan resumes are included in Attachment B:

Langan Technical Manager:	Mr. Jason Hayes Telephone: (212) 479-5427
Langan Project Manager:	Mr. Gerald Nicholls Telephone: (212) 479-5554
Langan Quality Assurance Officer (QAO):	Mr. William Bohrer Telephone: (212) 479-5533
Data Validator and Program Quality Assurance Monitor:	Mr. Joseph Conboy Telephone: (215) 845-8985
Laboratory Representative:	Ben Rao Alpha Analytical Telephone: (201) 812-2633 Ms. Lidya Gulizia York Analytical Telephone: (203) 325-1371 X833

4.0 QUALITY ASSURANCE/QUALITY CONTROL OBJECTIVES FOR MEASUREMENT OF DATA

The overall quality assurance objective is to develop and implement procedures for sampling, laboratory analysis, field measurements, and reporting that will provide data of sufficient quality for the remedial investigation at the Site. The sample set, chemical analysis results, and interpretations must be based on data that meet or exceed quality assurance objectives established for the Site. Quality assurance objectives are usually expressed in terms of accuracy or bias, sensitivity, completeness, representativeness, comparability, and sensitivity of analysis. Variances from the quality assurance objectives at any stage of the investigation will result in the implementation of appropriate corrective measures and an assessment of the impact of corrective measures on the usability of the data.

4.1 Precision

Precision is a measure of the degree to which two or more measurements are in agreement. Field precision is assessed through the collection and measurement of field duplicates. Laboratory precision and sample heterogeneity also contribute to the uncertainty of field duplicate measurements. This uncertainty is taken into account during the data assessment process. For field duplicates, results less than 2x the reporting limit (RL) meet the precision criteria if the absolute difference is less than ±2x the RL and acceptable based on professional judgement. For results greater than 2x the RL, the acceptance criteria is a relative percent difference (RPD) of ≤50% (soil and air), <30% (water). RLs and method detection limits (MDL) are provided in Attachment C.

4.2 Accuracy

Accuracy is the measurement of the reproducibility of the sampling and analytical methodology. It should be noted that precise data may not be accurate data. For the purpose of this QAPP, bias is defined as the constant or systematic distortion of a measurement process, which manifests itself as a persistent positive or negative deviation from the known or true value. This may be due to (but not limited to) improper sample collection, sample matrix, poorly calibrated analytical or sampling equipment, or limitations or errors in analytical methods and techniques.

Accuracy in the field is assessed through the use of field blanks and through compliance to all sample handling, preservation, and holding time requirements. All field blanks should be non-detect when analyzed by the laboratory. Any contaminant detected in an associated field blank will be evaluated against laboratory blanks (preparation or method) and evaluated against field samples collected on the same day to determine potential for bias. Trip blanks are not required for non-aqueous matrices but are planned for non-aqueous matrices where high concentrations of VOCs are anticipated.

Laboratory accuracy is assessed by evaluating the percent recoveries of matrix spike/matrix spike duplicate (MS/MSD) samples, laboratory control samples (LCS), surrogate compound recoveries, and the results of method preparation blanks. MS/MSD, LCS, and surrogate percent recoveries will be compared to either method-specific control limits or laboratory-derived control limits. Sample volume permitting, samples displaying outliers should be reanalyzed. All associated method blanks should be non-detect when analyzed by the laboratory.

4.3 Representativeness

Representativeness expresses the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition within a defined spatial and/or temporal boundary. Representativeness is dependent upon the adequate design of the sampling program and will be satisfied by ensuring that the scope of work is followed and that specified sampling and analysis techniques are used. This is performed by following applicable standard operating procedures (SOPs) and this QAPP. All field technicians will be given copies of appropriate documents prior to sampling events and are required to read, understand, and follow each document as it pertains to the tasks at hand.

Representativeness in the laboratory is ensured by compliance to nationally-recognized analytical methods, meeting sample holding times, and maintaining sample integrity while the samples are in the laboratory's possession. This is performed by following all applicable EPA methods, laboratory-issued SOPs, the laboratory's Quality Assurance Manual, and this QAPP. The laboratory is required to be properly certified and accredited.

4.4 Completeness

Laboratory completeness is the ratio of total number of samples analyzed and verified as acceptable compared to the number of samples submitted to the fixed-base laboratory for analysis, expressed as a percent. Three measures of completeness are defined:

- Sampling completeness, defined as the number of valid samples collected relative to the number of samples planned for collection;
- Analytical completeness, defined as the number of valid sample measurements relative to the number of valid samples collected; and
- Overall completeness, defined as the number of valid sample measurements relative to the number of samples planned for collection.

Air, soil vapor, soil, and groundwater data will meet a 90% completeness criterion. If the criterion is not met, sample results will be evaluated for trends in rejected and unusable data. The effect of unusable data required for a determination of compliance will also be evaluated.

4.5 Comparability

Comparability is an expression of the confidence with which one data set can be compared to another. Comparability is dependent upon the proper design of the sampling program and will be satisfied by ensuring that the sampling plan is followed and that sampling is performed according to the SOPs or other project-specific procedures. Analytical data will be comparable when similar sampling and analytical methods are used as documented in the QAPP. Comparability will be controlled by requiring the use of specific nationally-recognized analytical methods and requiring consistent method performance criteria. Comparability is also dependent on similar quality assurance objectives. Previously collected data will be evaluated to determine whether they may be combined with contemporary data sets.

4.6 Sensitivity

Sensitivity is the ability of the instrument or method to detect target analytes at the levels of interest. The project director will select, with input from the laboratory and QA personnel, sampling and analytical procedures that achieve the required levels of detection and QC acceptance limits that meet established performance criteria. Concurrently, the project director will select the level of data assessment to ensure that only data meeting the project DQOs are used in decision-making.

Field equipment will be used that can achieve the required levels of detection for analytical measurements in the field. In addition, the field sampling staff will collect and submit full volumes of samples as required by the laboratory for analysis, whenever possible. Full volume aliquots will help ensure achievement of the required limits of detection and allow for reanalysis if necessary. The concentration of the lowest level check standard in a multi-point calibration curve will represent the reporting limit.

Analytical methods and quality assurance parameters associated with the sampling program are presented in Attachment D. The frequency of associated field blanks and duplicate samples will be based on the recommendations listed in DER-10, and as described in Section 5.3.

Site-specific MS and MSD samples will be prepared and analyzed by the analytical laboratory by spiking an aliquot of submitted sample volume with analytes of interest. Additional sample volume is not required by the laboratory for this purpose. An MS/MSD analysis will be analyzed at a rate of 1 out of every 20 samples, or one per analytical batch. MS/MSD samples are only required for soil and groundwater samples.

5.0 SAMPLE COLLECTION AND FIELD DATA ACQUISITION PROCEDURES

Soil and groundwater sampling will be conducted in accordance with the established NYSDEC protocols contained in DER-10/Technical Guidance for Site Investigation and Remediation (May 2010) and the NYSDEC's "Guidance for Sampling and Analysis of PFAS Under NYSDEC's Part 375 Remedial Programs" (April 2023). Air sampling will be conducted in accordance with the established NYSDOH protocols contained in the Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006, updated May 2017). The following sections describe procedures to be followed for specific tasks.

5.1 Field Documentation Procedures

Field documentation procedures will include summarizing field observations in field books, and proper sample labeling. These procedures are described in the following sections.

5.1.1 Field Data and Notes

Field notebooks contain the documentary evidence regarding procedures conducted by field personnel. Hard cover, bound field notebooks will be used because of their compact size, durability, and secure page binding. The pages of the notebook will not be removed.

Entries will be made in waterproof, permanent blue or black ink. No erasures will be allowed. If an incorrect entry is made, the information will be crossed out with a single strike mark and the change initialed and dated by the team member making the change. Each entry will be dated. Entries will be legible and contain accurate and complete documentation of the individual or sampling team's activities or observations made. The level of detail will be sufficient to explain and reconstruct the activity conducted. Each entry will be signed by the person(s) making the entry.

The following types of information will be provided for each sampling task, as appropriate:

- Project name and number
- Reasons for being on-site or taking the sample
- Date and time of activity
- Sample identification numbers
- Geographical location of sampling points with references to the site, other facilities or a map coordinate system. Sketches will be made in the field logbook when appropriate
- Physical location of sampling locations such as depth below ground surface
- Description of the method of sampling including procedures followed, equipment used and any departure from the specified procedures
- Description of the sample including physical characteristics, odor, etc.
- Readings obtained from health and safety equipment

- Weather conditions at the time of sampling and previous meteorological events that may affect the representative nature of a sample
- Photographic information including a brief description of what was photographed, the date and time, the compass direction of the picture and the number of the picture on the camera
- Other pertinent observations such as the presence of other persons on the Site, actions by others that may affect performance of site tasks, etc.
- Names of sampling personnel and signature of persons making entries

Field records will also be collected on field data sheets including boring logs, which will be used for geologic and drilling data during soil boring activities. Field data sheets will include the project-specific number and stored in the field project files when not in use. At the completion of the field activities, the field data sheets will be maintained in the central project file.

5.1.2 Sample Labeling

Each sample collected will be assigned a unique identification number in accordance with the sample nomenclature guidance included in Attachment E and placed in an appropriate sample container. Each sample container will have a sample label affixed to the outside with the date and time of sample collection and project name. In addition, the label will contain the sample identification number, analysis required, and chemical preservatives added, if any. All documentation will be completed in waterproof ink.

5.2 Equipment Calibration and Preventative Maintenance

A photoionization detector (PID) will be used during the sampling activities to evaluate work zone action levels and screen soil during excavation/disposal and before collecting performance documentation samples. Field calibration and/or field checking of the PID will be the responsibility of the field team leader and the site HSO, and will be accomplished by following the procedures outlined in the operating manual for the instrument. An air monitor capable of measuring particulate matter up to 10 micrometers (µm) in diameter will be used to evaluate perimeter air quality resulting from the work. At a minimum, field calibration and/or field equipment checking will be performed once daily, prior to use. Field calibration will be documented in the field notebook. Entries made into the logbook regarding the status of field equipment will include the following information:

- Date and time of calibration
- Type of equipment serviced and identification number (such as serial number)
- Reference standard used for calibration
- Calibration and/or maintenance procedure used
- Other pertinent information

Equipment that fails calibration or becomes inoperable during use will be removed from service and segregated to prevent inadvertent utilization. The equipment will be properly tagged to indicate that it is out of calibration. Such equipment will be repaired and recalibrated to the manufacturer's specifications by qualified personnel. Equipment that cannot be repaired will be replaced.

Off-site calibration and maintenance of field instruments will be conducted as appropriate throughout the duration of project activities. All field instrumentation, sampling equipment and accessories will be maintained in accordance with the manufacturer's recommendations and specifications and established field equipment practice. Off-site calibration and maintenance will be performed by qualified personnel. A logbook will be kept to document that established calibration and maintenance procedures have been followed. Documentation will include both scheduled and unscheduled maintenance.

5.3 Sample Collection

5.3.1 Soil Samples

Soil samples will be visually classified and field screened using a PID to assess potential impacts from VOCs and for health and safety monitoring. Soil samples collected for analysis of VOCs will be collected using either EnCore® or Terra Core® sampling equipment. For analysis of non-volatile parameters, samples will be homogenized and placed into glass jars. After collection, all sample jars will be capped and securely tightened, and placed in iced coolers and maintained at 4°C ±2°C until they are transferred to the laboratory for analysis, in accordance with the procedures outlined in Section 5.4. Analysis and/or extraction and digestion of collected soil samples will meet the holding times required for each analyte as specified in Attachment D. In addition, analysis of collected soil sample will meet all quality assurance criteria set forth by this QAPP and DER-10.

5.3.2 Groundwater Samples

Groundwater sampling will be conducted using low-flow sampling procedures following USEPA guidance ("Low Stress [low flow] Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells", EQASOP-GW4, September 19, 2017). Groundwater samples collected for PFAS will be collected in accordance with the protocols established in NYSDEC's "Guidance for Sampling, Analysis, and Assessment of PFAS Under NYSDEC's Part 375 Remedial Programs" (April 2023), which is provided in Attachment F.

During purging, field parameters should be measured, including: water level drawdown, purge rate, pH, specific conductance, temperature, dissolved oxygen, turbidity and ORP, every five minutes using a water quality meter (Horiba U-52 or similar) and a depth-to-water oil-water interface probe that should be decontaminated between wells. For wells being sampled with PFAS, monitoring wells will be gauged for depth to water following sample collection. Samples should generally not be collected until the field parameters have stabilized. Field parameters will be considered stable once three sets of measurements are within ±0.1 standard units for pH, ±3% for conductivity and temperature, ±10 millivolts for ORP, and ±10% for turbidity and dissolved oxygen. Purge rates should be adjusted to keep the drawdown in the well to less than

0.3 feet, as practical. Additionally, an attempt should be made to achieve a stable turbidity reading of less than 10 Nephelometric Turbidity Units (NTU) prior to sampling. If the turbidity reading does not stabilize at reading of less than 10 NTU for a given well, then both filtered and unfiltered samples should be collected from that well. If necessary, field filtration should be performed using a 0.45-micron disposable in-line filter. Groundwater samples should be collected after parameters have stabilized as noted above or the readings are within the precision of the meter. Deviations from the stabilization and drawdown criteria, if any, should be noted on the sampling logs.

Samples should be collected directly into pre-cleaned laboratory-supplied jars. Samples collected for PFAS analysis will be collected into HDPE containers. After collection, sample jars will be capped and securely tightened, and placed in iced coolers to attempt to maintain a temperature of 4°C ±2°C until they are transferred to the laboratory for analysis, in accordance with the procedures outlined in Section 5.4. Analysis and/or extraction and digestion of collected groundwater samples will meet the holding times required for each analyte as specified in Attachment C. In addition, analysis of collected groundwater samples will meet all quality assurance criteria set forth by this QAPP and DER-10.

5.3.3 Air Samples

In the event that soil vapor sampling is required, prior to sample collection, a pre-sampling inspection will be conducted to document chemicals and potential subsurface pathways at the site. Air samples will be collected into laboratory-supplied, batch certified-clean Summa® canisters calibrated for a duration of two to eight hours. The pressure gauges on each calibrated flow controller should be monitored throughout sample collection. Sample collection should be stopped when the pressure reading reaches -4 mmHg.

If a sub-slab depressurization system is necessary in future buildings developed at the site, sub-slab samples will be collected from vapor monitoring points or from riser pipe sample ports. The samples will be collected into laboratory-supplied, batch certified-clean Summa® canisters calibrated for a duration of two to eight hours. The pressure gauges on each calibrated flow controller should be monitored throughout sample collection. Sample collection should be stopped when the pressure reading reaches -4 mmHg.

5.3.4 Sample Field Blanks and Duplicates

Field blanks will be collected for quality assurance purposes at a rate of one per 20 investigative samples per matrix (soil and groundwater only). For PFAS and 1,4-dioxane, field blanks will be collected at a frequency of one per day per matrix. Field blanks will be obtained by pouring laboratory-demonstrated analyte-free water on or through a decontaminated sampling device following use and implementation of decontamination protocols. The water will be collected off of the sampling device into a laboratory-provided sample container for analysis. Field blank samples will be analyzed for the complete list of analytes on the day of sampling. Trip blanks will be collected for each sample shipment that includes VOC analysis.

Duplicate soil samples will be collected and analyzed for quality assurance purposes. Duplicate samples will be collected at a frequency of 1 per 20 samples and will be submitted to the laboratory as "blind" samples. If less than 20 samples are collected during a particular sampling event, one duplicate sample will be collected.

5.4 Sample Containers and Handling

Certified, commercially clean sample containers will be obtained from the analytical laboratory. For soil and groundwater samples, the laboratory will also prepare and supply the required trip blanks and field blank sample containers and reagent preservatives. Sample bottle containers, including the field blank containers, will be placed into plastic coolers by the laboratory. These coolers will be received by the field sampling team within 24 hours of their preparation in the laboratory. Prior to the commencement of field work, Langan field personnel will fill the plastic coolers with ice in Ziploc® bags (or equivalent) to maintain a temperature of 4° ±2° C.

Soil samples collected in the field for laboratory analysis will be placed directly into the laboratory-supplied sample containers. Samples will then be placed and stored on-ice in laboratory provided coolers until shipment to the laboratory. The temperature in the coolers containing samples and associated field blanks will be maintained at a temperature of 4°±2°C while on-site and during sample shipment to the analytical laboratory. Blue ice will not be used to cool PFAS samples.

Possession of samples collected in the field will be traceable from the time of collection until they are analyzed by the analytical laboratory or are properly disposed. Chain-of-custody procedures, described in Section 5.9, will be followed to maintain and document sample possession. Samples will be packaged and shipped as described in Section 5.6.

5.5 Special Considerations for Emerging Contaminant Sample Collection

The following special considerations apply to the collection of soil and groundwater samples for PFAS analysis to prevent cross-contamination:

- Field equipment will not contain Teflon®
- All sampling material will be made from stainless steel, HDPE, acetate, silicon, or polypropylene
- No waterproof field books will be used
- No plastic clipboards, binders, or spiral hard cover notebooks will be used
- No adhesives will be used
- No sharpies or permanent markers will be used; ball point pens are acceptable
- Aluminum foil will not be used
- PFAS samples will be kept in a separate cooler from other sampling containers
- Coolers will be filled only with regular ice

PFAS will be analyzed by modified USEPA Method 1633 for the PFAS target analyte list developed by the DER. At minimum, the laboratory will report the following PFAS target compounds:

Group	Chemical Name	Abbreviation	CAS Number
Perfluoroalkyl sulfonic acids	Perfluorobutanesulfonic acid	PFBS	375-73-5
	Perfluoropentanesulfonic acid	PFPeS	2706-91-4
	Perfluorohexanesulfonic acid	PFHxS	355-46-4
	Perfluoroheptanesulfonic acid	PFHpS	375-92-8
	Perfluorooctanesulfonic acid	PFOS	1763-23-1
	Perfluorononanesulfonic acid	PFNS	68259-12-1
	Perfluorodecanesulfonic acid	PFDS	335-77-3
	Perfluorododecanesulfonic acid	PFDoS	79780-39-5
Perfluoroalkyl carboxylic acids	Perfluorobutanoic acid	PFBA	375-22-4
	Perfluoropentanoic acid	PFPeA	2706-90-3
	Perfluorohexanoic acid	PFHxA	307-24-4
	Perfluoroheptanoic acid	PFHpA	375-85-9
	Perfluorooctanoic acid	PFOA	335-67-1
	Perfluorononanoic acid	PFNA	375-95-1
	Perfluorodecanoic acid	PFDA	335-76-2
	Perfluoroundecanoic acid	PFUnA	2058-94-8
	Perfluorododecanoic acid	PFDoA	307-55-1
	Perfluorotridecanoic acid	PFTrDA	72629-94-8
	Perfluorotetradecanoic acid	PFTeDA	376-06-7
Per- and Polyfluoroether carboxylic acids	Hexafluoropropylene oxide dimer acid	HFPO-DA	13252-13-6
	4,8-Dioxa-3H-perfluorononanoic acid	ADONA	919005-14-4
	Perfluoro-3-methoxypropanoic acid	PFMPA	377-73-1
	Perfluoro-4-methoxybutanoic acid	PFMBA	863090-89-5
	Nonafluoro-3,6-dioxaheptanoic acid	NFDHA	151772-58-6
Fluorotelomer sulfonic acids	4:2 Fluorotelomer sulfonic acid	4:2-FTS	757124-72-4
	6:2 Fluorotelomer sulfonic acid	6:2-FTS	27619-97-2
	8:2 Fluorotelomer sulfonic acid	8:2-FTS	39108-34-4
Fluorotelomer carboxylic acids	3:3 Fluorotelomer carboxylic acid	3:3 FTCA	356-02-5
	5:3 Fluorotelomer carboxylic acid	5:3 FTCA	914637-49-3
	7:3 Fluorotelomer carboxylic acid	7:3 FTCA	812-70-4
Perfluorooctane sulfonamides	Perfluorooctane sulfonamide	PFOSA	754-91-6
	N-methylperfluorooctane sulfonamide	NMeFOSA	31506-32-8
	N-ethylperfluorooctane sulfonamide	NEtFOSA	4151-50-2

Perfluorooctane sulfonamidoacetic acids	N-methylperfluorooctane sulfonamidoacetic acid	N-MeFOSAA	2355-31-9
	N-ethylperfluorooctane sulfonamidoacetic acid	N-EtFOSAA	2991-50-6
Perfluorooctane sulfonamide ethanols	N-methylperfluorooctane sulfonamidoethanol	MeFOSE	24448-09-7
	N-ethylperfluorooctane sulfonamidoethanol	EtFOSE	1691-99-2
Ether sulfonic acids	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (F-53B Major)	9Cl-PF3ONS	756426-58-1
	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (F-53B Minor)	11Cl-PF3OUdS	763051-92-9
	Perfluoro(2-ethoxyethane) sulfonic acid	PFEESA	113507-82-7

The laboratory reporting limits for PFAS are 2 nanograms per liter (ng/L) in aqueous samples and 1 microgram per kilogram (µg/kg) in soil samples. The laboratory SOP for PFAS analysis and PFAS compound sampling protocol are provided in Attachment E.

Soil samples analyzed for 1,4-dioxane will be analyzed via USEPA method 8270, and groundwater samples will be analyzed by USEPA Method 8270 SIM. The laboratory reporting limits for 1,4-dioxane are 0.15 micrograms per liter (µg/L) in aqueous samples and 0.08 milligrams per kilogram (mg/kg) in soil samples.

5.6 Sample Preservation

Sample preservation measures will be used in an attempt to prevent sample decomposition by contamination, degradation, biological transformation, chemical interactions and other factors during the time between sample collection and analysis. Preservation will commence at the time of sample collection and will continue until analyses are performed. Should chemical preservation be required, the analytical laboratory will add the preservatives to the appropriate sample containers before shipment to the office or field. Samples will be preserved according to the requirements of the specific analytical method selected, as shown in Attachment D.

5.7 Sample Shipment

5.7.1 Packaging

Air sample canisters can be stored and transported without additional packaging. Soil sample containers will be placed in plastic coolers. Ice in Ziploc® bags (or equivalent) will be placed around sample containers. PFAS samples will be stored in separate coolers, and blue ice will not be used to cool PFAS samples. Cushioning material will be added around the sample containers if necessary. Chains-of-custody and other paperwork will be placed in a Ziploc® bag (or equivalent) and placed inside the cooler. The cooler will be taped closed and custody seals will

be affixed to one side of the cooler at a minimum. If the samples are being shipped by an express delivery company (e.g. FedEx) then laboratory address labels will be placed on top of the cooler.

5.7.2 Shipping

Standard procedures to be followed for shipping environmental samples to the analytical laboratory are outlined below.

- All efforts will be made to transport environmental samples to the laboratory within 24 hours from the time of collection by a laboratory-provided courier or express delivery company (e.g. FedEx) under the chain-of-custody protocols described in Section 5.9.
- Prior notice will be provided to the laboratory regarding when to expect shipped samples. If the number, type or date of shipment changes due to site constraints or program changes, the laboratory will be informed.

5.8 Decontamination Procedures

Decontamination procedures will be used for non-dedicated sampling equipment. Decontamination of field personnel is discussed in the site-specific Construction Health and Safety Plan (CHASP) included as an Appendix to the SMP. Field sampling equipment that is to be reused will be decontaminated in the field in accordance with the following procedures:

1. Laboratory-grade glassware detergent and tap water scrub to remove visual contamination
2. Generous tap water rinse
3. Distilled/de-ionized water rinse

Sample equipment used to collect PFAS samples will be decontaminated via a standard two step decontamination procedure using PFAS-free water. Decontamination water will be verified to be PFAS-free via laboratory analysis or certification in accordance with NYSDEC's "Guidance for Sampling, Analysis, and Assessment of PFAS Under NYSDEC's Part 375 Remedial Programs" (April 2023).

5.9 Residuals Management

Debris (e.g., paper, plastic and disposable PPE) will be collected in plastic garbage bags and disposed of as non-hazardous industrial waste. Debris is expected to be transported to a local municipal landfill for disposal.

Residual fluids (such as dewatering fluids) will be collected by pumping into a dedicated DOT-approved (or equivalent) vehicle for transport and off-site disposal. The residual fluids will be disposed of off-site in accordance with applicable federal and state regulations. Residual fluids such as decontamination water may be discharged to the ground surface, however, if gross contamination is observed, the residual fluids will be collected, stored, and transported similar purge water or other residual fluids.

5.10 Chain of Custody Procedures

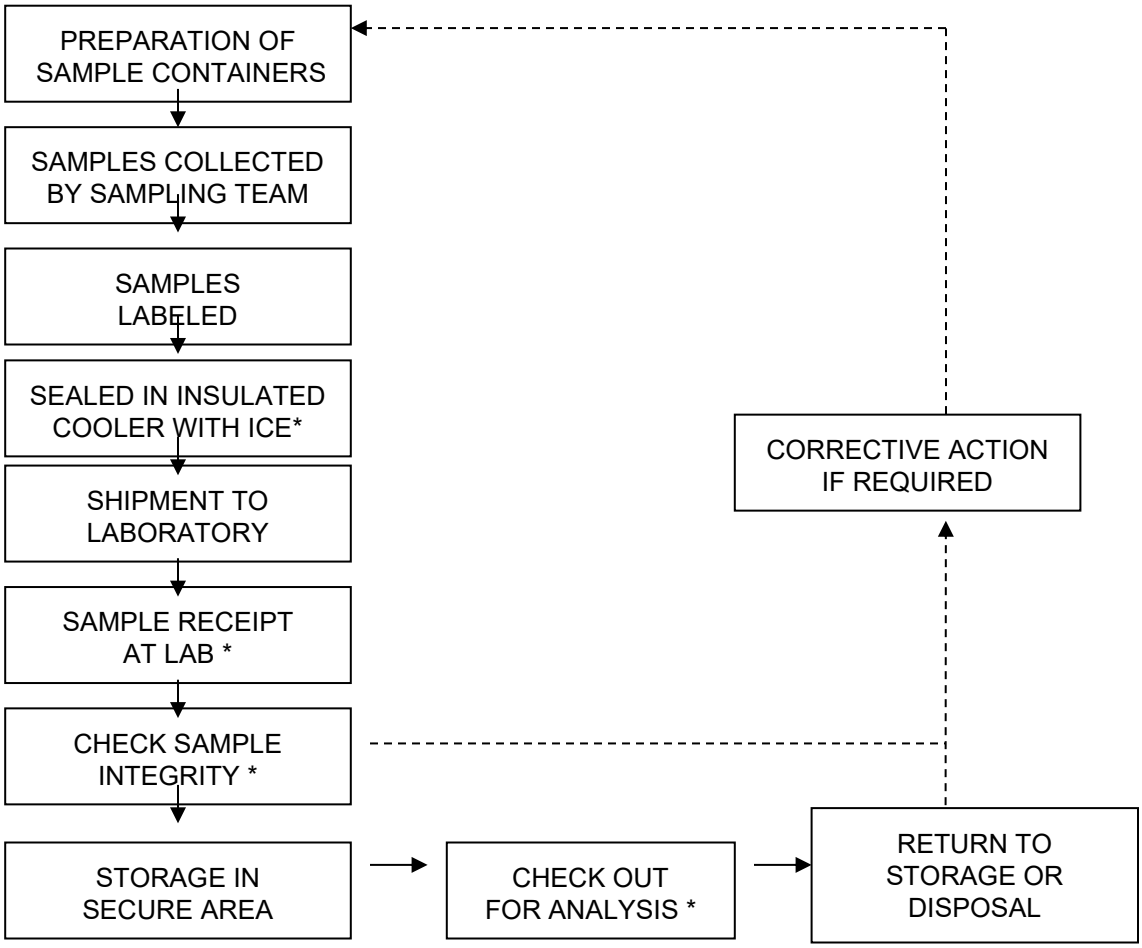
A chain-of-custody protocol has been established for collected samples that will be followed during sample handling activities in both field and laboratory operations. The primary purpose of the chain-of-custody procedures is to document the possession of the samples from collection through shipping, storage and analysis to data reporting and disposal. Chain-of-custody refers to actual possession of the samples. Samples are considered to be in custody if they are within sight of the individual responsible for their security or locked in a secure location. Each person who takes possession of the samples, except the shipping courier, is responsible for sample integrity and safe keeping. Chain-of-custody procedures are provided below:

- Chain-of-custody will be initiated by the laboratory supplying the pre-cleaned and prepared sample containers. Chain-of-custody forms will accompany the sample containers.
- Following sample collection, the chain-of-custody form will be completed for the sample collected. The sample identification number, date and time of sample collection, analysis requested and other pertinent information (e.g., preservatives) will be recorded on the form. All entries will be made in waterproof, permanent blue or black ink.
- Langan field personnel will be responsible for the care and custody of the samples collected until the samples are transferred to another party, dispatched to the laboratory, or disposed. The sampling team leader will be responsible for enforcing chain-of-custody procedures during field work.
- When the form is full or when all samples have been collected that will fit in a single cooler, the sampling team leader will check the form for possible errors and sign the chain-of-custody form. Any necessary corrections will be made to the record with a single strike mark, dated, and initialed.

Sample coolers will be accompanied by the chain-of-custody form, sealed in a Ziploc® bag (or equivalent) and placed on top of the samples or taped to the inside of the cooler lid. If applicable, a shipping bill will be completed for each cooler and the shipping bill number recorded on the chain-of-custody form.

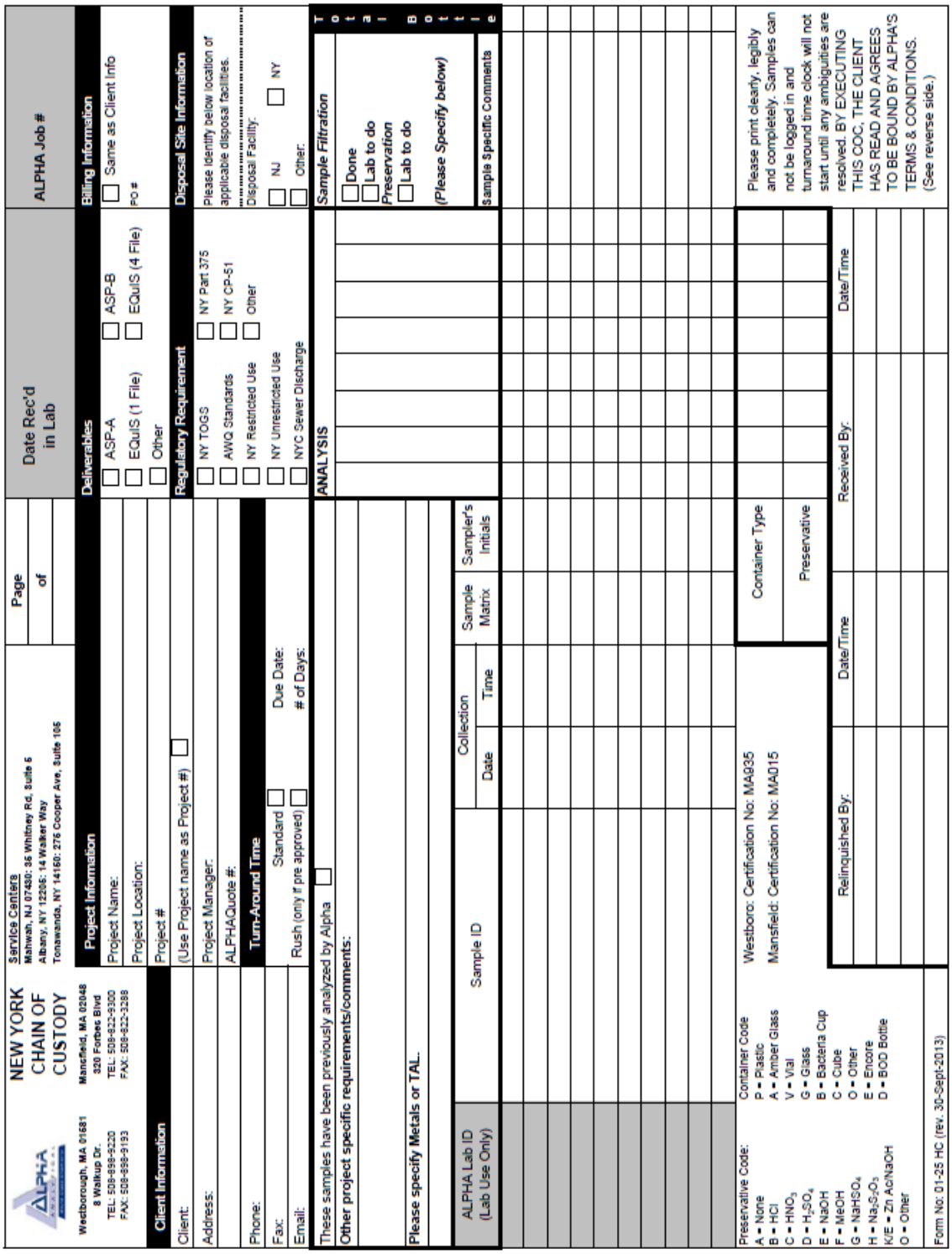
Samples will be packaged for shipment to the laboratory with the appropriate chain-of-custody form. A copy of the form will be retained by the sampling team for the project file and the original will be sent to the laboratory with the samples. Bills of lading will also be retained as part of the documentation for the chain-of-custody records, if applicable. When transferring custody of the samples, the individuals relinquishing and receiving custody of the samples will verify sample numbers and condition and will document the sample acquisition and transfer by signing and dating the chain-of-custody form. This process documents sample custody transfer from the sampler to the analytical laboratory. A flow chart showing a sample custody process is included as Figure 5.1, and a chain-of-custody form is included as Figure 5.2.

Figure 5-1 Sample Custody



* REQUIRES SIGN-OFF ON CHAIN-OF-CUSTODY FORM

Figure 5.2 Sample Chain-of-Custody Form



Laboratory chain-of-custody will be maintained throughout the analytical processes as described in the laboratory's Quality Assurance Manual. The analytical laboratory will provide a copy of the chain-of-custody in the analytical data deliverable package. The chain-of-custody becomes the permanent record of sample handling and shipment.

5.11 Laboratory Sample Storage Procedures

The subcontracted laboratory will use a laboratory information management system (LIMS) to track and schedule samples upon receipt by the analytical laboratories. Any sample anomalies identified during sample log-in must be evaluated on individual merit for the impact upon the results and the data quality objectives of the project. When irregularities do exist, the environmental consultant must be notified to discuss recommended courses of action and documentation of the issue must be included in the project file.

For samples requiring thermal preservation, the temperature of each cooler will be immediately recorded. Each sample and container will be will be assigned a unique laboratory identification number and secured within the custody room walk-in coolers designated for new samples. Samples will be, as soon as practical, disbursed in a manner that is functional for the operational team. The temperature of all coolers and freezers will be monitored and recorded using a certified temperature sensor. Any temperature excursions outside of acceptance criteria (i.e., below 2°C or above 6°C) will initiate an investigation to determine whether any samples may have been affected. Samples for VOCs will be maintained in satellite storage areas within the VOC laboratory. Following analysis, the laboratory's specific procedures for retention and disposal will be followed as specified in the laboratory's SOPs and/or QA manual.

6.0 DATA REDUCTION, VALIDATION, AND REPORTING

6.1 Introduction

Data collected as part of the remedial performance sampling will be reduced and reviewed by the laboratory QA personnel, and a report on the findings will be tabulated in a standard format. The criteria used to identify and quantify the analytes will be those specified for the applicable methods in the USEPA SW-846 and subsequent updates. The data package provided by the laboratory will contain all items specified in the USEPA SW-846 appropriate for the analyses to be performed, and be reported in standard format.

The completed copies of the chain-of-custody records (both external and internal) accompanying each sample from time of initial bottle preparation to completion of analysis shall be attached to the analytical reports.

6.2 Data Reduction

The Analytical Services Protocol (ASP) Category B data packages and an electronic data deliverable (EDD) will be provided by the laboratory after receipt of a complete sample delivery group. The Project Manager will immediately arrange for archiving the results and preparation of result tables. These tables will form the database for assessment of contamination conditions at the Site.

Each EDD deliverable must be formatted using a Microsoft Windows operating system and the NYSDEC data deliverable format for EQuIS. To avoid transcription errors, data will be loaded directly into the ASCII format from the laboratory information management system (LIMS). If this cannot be accomplished, the consultant should be notified via letter of transmittal indicating that manual entry of data is required for a particular method of analysis. All EDDs must also undergo a QC check by the laboratory before delivery. The original data, tabulations, and electronic media are stored in a secure and retrievable fashion.

The Project Manager or Task Manager will maintain close contact with the QA reviewer to ensure all non-conformance issues are acted upon prior to data manipulation and assessment routines. Once the QA review has been completed, the Project Manager may direct the Team Leaders or others to initiate and finalize the analytical data assessment.

6.3 Data Validation

Data validation will be performed in accordance with the USEPA validation guidelines for organic and inorganic data review. Validation will include the following:

- Verification of the QC sample results,
- Verification of the identification of sample results (both positive hits and non-detects),
- Recalculation of 10% of all investigative sample results, and
- Preparation of Data Usability Summary Reports (DUSR).

A DUSR will be prepared and reviewed by the QAO before issuance. The DUSR will present the results of data validation, including a summary assessment of laboratory data packages, sample preservation and COC procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness for each analytical method. A detailed assessment of each SDG will follow. For each of the organic analytical methods, the following will be assessed:

- Holding times;
- Instrument tuning;
- Instrument calibrations;
- Blank results;
- System monitoring compounds or surrogate recovery compounds (as applicable);
- Internal standard recovery results;
- MS and MSD results;
- Target compound identification;
- Chromatogram quality;
- Pesticide cleanup (if applicable);
- Compound quantitation and reported detection limits;
- System performance; and
- Results verification.

For each of the inorganic compounds, the following will be assessed:

- Holding times;
- Calibrations;
- Blank results;
- Interference check sample;
- Laboratory check samples;
- Duplicates;
- Matrix Spike;
- Furnace atomic absorption analysis QC;
- ICP serial dilutions; and
- Results verification and reported detection limits.

Based on the results of data validation, the validated analytical results reported by the laboratory will be assigned one of the following usability flags:

- "U" - Not detected. The associated number indicates the approximate sample concentration necessary to be detected significantly greater than the level of the highest associated blank;
- "UJ" - Not detected. Quantitation limit may be inaccurate or imprecise;
- "J" - Analyte is present. Reported value may be associated with a higher level of uncertainty than is normally expected with the analytical method
- "N" – Tentative identification. Analyte is considered present in the sample;
- "R" – Unreliable result; data is rejected or unusable. Analyte may or may not be present in the sample; and
- No Flag - Result accepted without qualification.

6.3 Reporting

Upon receipt of validated analytical results, NYSDEC format EDDs, compatible with EQuIS, will be prepared and submitted to the NYSDEC.

7.0 QUALITY ASSURANCE PERFORMANCE AUDITS AND SYSTEM AUDITS

7.1 Introduction

Quality assurance audits may be performed by the project quality assurance group under the direction and approval of the QAO. These audits will be implemented to evaluate the capability and performance of project and subcontractor personnel, items, activities, and documentation of the measurement system(s). Functioning as an independent body and reporting directly to corporate quality assurance management, the QAO may plan, schedule, and approve system and performance audits based upon procedures customized to the project requirements. At times, the QAO may request additional personnel with specific expertise from company and/or project groups to assist in conducting performance audits. However, these personnel will not have responsibility for the project work associated with the performance audit.

7.2 System Audits

System audits may be performed by the QAO or designated auditors, and encompass a qualitative evaluation of measurement system components to ascertain their appropriate selection and application. In addition, field and laboratory quality control procedures and associated documentation may be system audited. These audits may be performed once during the performance of the project. However, if conditions adverse to quality are detected or if the Project Manager requests, additional audits may be performed.

7.3 Performance Audits

The laboratory may be required to conduct an analysis of Performance Evaluation samples or provide proof that Performance Evaluation samples submitted by USEPA or a state agency have been analyzed within the past twelve months.

7.4 Formal Audits

Formal audits refer to any system or performance audit that is documented and implemented by the QA group. These audits encompass documented activities performed by qualified lead auditors to a written procedure or checklists to objectively verify that quality assurance requirements have been developed, documented, and instituted in accordance with contractual and project criteria. Formal audits may be performed on project and subcontractor work at various locations.

Audit reports will be written by auditors who have performed the site audit after gathering and evaluating all data. Items, activities, and documents determined by lead auditors to be in noncompliance shall be identified at exit interviews conducted with the involved management. Non-compliances will be logged, and documented through audit findings, which are attached to and are a part of the integral audit report. These audit-finding forms are directed to management to satisfactorily resolve the noncompliance in a specified and timely manner.

The Project Manager has overall responsibility to ensure that all corrective actions necessary to resolve audit findings are acted upon promptly and satisfactorily. Audit reports must be

submitted to the Project Manager within fifteen days of completion of the audit. Serious deficiencies will be reported to the Project Manager within 24 hours. All audit checklists, audit reports, audit findings, and acceptable resolutions are approved by the QAO prior to issue. Verification of acceptable resolutions may be determined by re-audit or documented surveillance of the item or activity. Upon verification acceptance, the QAO will close out the audit report and findings.

8.0 CORRECTIVE ACTION

8.1 Introduction

The following procedures have been established to ensure that conditions adverse to quality, such as malfunctions, deficiencies, deviations, and errors, are promptly investigated, documented, evaluated, and corrected.

8.2 Procedure Description

When a significant condition adverse to quality is noted at site, laboratory, or subcontractor location, the cause of the condition will be determined and corrective action will be taken to preclude repetition. Condition identification, cause, reference documents, and corrective action planned to be taken will be documented and reported to the QAO, Project Manager, Field Team Leader and involved contractor management, at a minimum. Implementation of corrective action is verified by documented follow-up action.

All project personnel have the responsibility, as part of the normal work duties, to promptly identify, solicit approved correction, and report conditions adverse to quality. Corrective actions will be initiated as follows:

- When predetermined acceptance standards are not attained;
- When procedure or data compiled are determined to be deficient;
- When equipment or instrumentation is found to be faulty;
- When samples and analytical test results are not clearly traceable;
- When quality assurance requirements have been violated;
- When designated approvals have been circumvented;
- As a result of system and performance audits;
- As a result of a management assessment;
- As a result of laboratory/field comparison studies; and
- As required by USEPA SW-846, and subsequent updates, or by the NYSDEC ASP.

Project management and staff, such as field investigation teams, remedial response planning personnel, and laboratory groups, monitor on-going work performance in the normal course of daily responsibilities. Work may be audited at the sites, laboratories, or contractor locations. Activities, or documents ascertained to be noncompliant with quality assurance requirements will be documented. Corrective actions will be mandated through audit finding sheets attached to the audit report. Audit findings are logged, maintained, and controlled by the Task Manager.

Personnel assigned to quality assurance functions will have the responsibility to issue and control Corrective Action Request (CAR) Forms (Figure 12.1 or similar). The CAR identifies the out-of-compliance condition, reference document(s), and recommended corrective action(s) to be

administered. The CAR is issued to the personnel responsible for the affected item or activity. A copy is also submitted to the Project Manager. The individual to whom the CAR is addressed returns the requested response promptly to the QA personnel, affixing his/her signature and date to the corrective action block, after stating the cause of the conditions and corrective action to be taken. The QA personnel maintain the log for status of CARs, confirms the adequacy of the intended corrective action, and verifies its implementation. CARs will be retained in the project file for the records.

Any project personnel may identify noncompliance issues; however, the designated QA personnel are responsible for documenting, numbering, logging, and verifying the close out action. The Project Manager will be responsible for ensuring that all recommended corrective actions are implemented, documented, and approved.

FIGURE 8.1

CORRECTIVE ACTION REQUEST

Number: _____ Date: _____

TO: _____

You are hereby requested to take corrective actions indicated below and as otherwise determined by you to (a) resolve the noted condition and (b) to prevent it from recurring. Your written response is to be returned to the project quality assurance manager by _____

CONDITION:

REFERENCE DOCUMENTS:

RECOMMENDED CORRECTIVE ACTIONS:

_____ _____ _____ _____ _____ _____

Originator Date Approval Date Approval Date

RESPONSE

CAUSE OF CONDITION

CORRECTIVE ACTION

(A) RESOLUTION

(B) PREVENTION

(C) AFFECTED DOCUMENTS

C.A. FOLLOWUP:

CORRECTIVE ACTION VERIFIED BY: _____ DATE:_____

9.0 REFERENCES

NYSDEC. Division of Environmental Remediation. DER-10/Technical Guidance for Site Investigation and Remediation, dated May 3, 2010.

NYSDEC. Guidance for Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs, dated April 2023.

NYSDOH. Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York, dated October 2006.

Taylor, J. K., 1987. Quality Assurance of Chemical Measurements. Lewis Publishers, Inc., Chelsea, Michigan

USEPA, 1986. SW-846 "Test Method for Evaluating Solid Waste," dated November 1986. U.S. Environmental Protection Agency, Washington, D.C.

USEPA, 1987. Data Quality Objectives for Remedial Response Actions Activities: Development Process, EPA/540/G-87/003, OSWER Directive 9355.0-7- U.S. Environmental Protection Agency, Washington, D.C.

USEPA, 2012. ICP-AES Data Validation. SOP No. HW-2a, Revisions 15, dated December 2012, USEPA Region II.

USEPA, 2012. ICP-MS Data Validation. SOP No. HW-2b, Revisions 15, dated December 2012, USEPA Region II.

USEPA, 2012. Mercury and Cyanide Data Validation. SOP No. HW-2c, Revisions 15, dated December 2012, USEPA Region II.USEPA. Hazardous Waste Support Section. Analysis of Volatile Organic Compounds in Air Contained in Canisters by Method TO-15. SOP No. HW-31, Revision #6, dated June 2014.

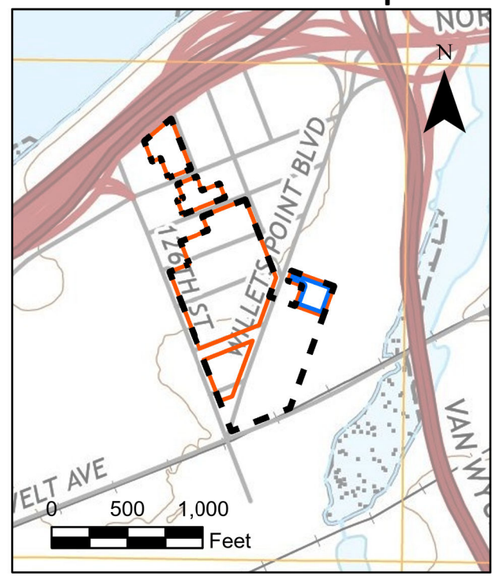
ATTACHMENT A

SITE LOCATION MAP

Legend

- Approximate BCP Site Boundary
- Former Willets Point Development BCP Site Boundary
- Former OU-2 Boundary
- Tax Lot

Reference Map



Notes:
1. Light Gray Canvas basemap provided through Langan's Esri and ArcGIS software licensing and ArcGIS Online.
2. Topographic basemap adapted from United States Geological Survey (USGS) 7.5-Minute Series Topographical Maps, Flushing, New York, Quadrangle.
3. Tax parcel data provided by the New York City Department of City Planning, MapPLUTO 23v2, and a survey prepared by Langan, July 28, 2023.

250 0 250
SCALE IN FEET

LANGAN
Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
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Project	WILLETS POINT DEVELOPMENT L-PARCEL BCP SITE NO. C241146-H QUEENS NEW YORK
Figure Title	SITE LOCATION AND LAYOUT PLAN
Project No.	170197601
Date	11/1/2023
Scale	1"=250'
Drawn By	GS
Figure No.	1
	Figure 1 of 7

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ATTACHMENT B

RESUMES

WILLIAM BOHRER, PG

PROJECT GEOLOGIST

GEOLOGIST

Mr. Bohrer is an experienced geologist responsible for managing Langan's environmental standards and Health and Safety compliance for projects throughout New York City. His services include dissemination of environmental protocols, troubleshooting at project sites, in-house/field training, and maintenance of quality standards across the environmental discipline. Mr. Bohrer has a diverse and extensive background in geophysics, hydrogeology, mining and petroleum, and geotechnical engineering. He has developed conceptual site models for public, industrial and commercial facilities nationwide.

SELECTED PROJECTS

- NYU Poly – 122 Johnson Street, Brooklyn, NY
- Con Edison of New York at Governor's Island, NY, NY
- 535 4th Avenue, Brooklyn, NY
- 27 Wooster Street, New York, NY
- 42 West Street, Brooklyn, NY
- 455 West 19th Street, New York, NY
- Kings Plaza Mall, Brooklyn, NY
- Hudson Yards "Terra Firma", New York, NY
- Hudson Yards, Platform Special Inspection, New York, NY
- PSAC II, Bronx, NY
- 595-647 Smith Street, Brooklyn, NY
- New York University, 7-13 Washington Square North Investigation, New York, NY
- NYU 4 Washington Square Village, New York, NY
- 125th Street and Lenox Avenue, New York, NY
- Sullivan Street Development, New York, NY
- Hudson Crossing II, New York, NY
- New York Aquarium, Shark Tank & Animal Care Facility, Brooklyn, NY
- 209-219 Sullivan Street, New York, NY
- 261 Hudson Street, New York, NY
- 460 Washington Street, New York, NY
- 552 West 24th Street, New York, NY
- Brooklyn Bridge Park Pier 1, New York, NY
- International Leadership Bronx Charter School, Bronx, NY
- 203 East 92nd Street, New York, NY
- HighLine 28-29, New York, NY
- 539 Smith Street Bulkhead, Brooklyn, NY
- Willets Point, Corona, NY
- Plume Migration and Fracture Flow Aquifer Investigation, Brunswick, MD
- Plume Migration and Fracture Flow Aquifer Investigation, Fallston, MD
- Emergency Response Site Investigation & Remediation, Wappingers Falls, NY
- Emergency Response Site Investigation & Remediation, Allentown, PA

EDUCATION

Post Graduate Studies in Geophysics
Cornell University

B.S., Geology
Tufts University

PROFESSIONAL REGISTRATION

Professional Geologist (PG) in NY

40 Hour OSHA HazWOPER

OSHA Construction Safety & Health

OSHA Supervisory Certification
Credential (TWIC)

Transportation Worker Identification

NYS DEC- Protecting New York's Natural Resources with Better Construction Site Management

AFFILIATIONS

American Association of Petroleum Geologists

National Groundwater Association

Geological Society of America

LANGAN

- Emergency Response Site Investigation & Remediation, Shamokin, PA
- Bermuda International Airport, Jet Fuel Release Investigation, Bermuda
- Little Missouri River Basin, Geotechnical Site Evaluation (Horizontal Drilling Pipeline Install), ND
- Seismic Susceptibility Evaluation (Class 2 Injection Wells), Litchfield, OH
- Bedrock Mapping, Bradford and Sullivan Counties, PA
- Soil Solidification, Carteret, NJ

PA Council of Professional Geologists

JASON J. HAYES, PE, LEED AP

PRINCIPAL/VICE PRESIDENT

ENVIRONMENTAL ENGINEERING

Mr. Hayes has experience in New York, New Jersey, Washington D.C., California, Washington, Oregon, Alaska, and Internationally. His experience includes Environmental Protection Agency (EPA), New York State (NYS) Brownfields applications, investigation, and remediation; New York City Department of Environmental Protection (NYCDEP) and New York City Office of Environmental Remediation (OER) E-designated site applications, investigations, and remediation. His expertise also includes Phase I and II Environmental Site Investigations and Assessments; contaminated building cleanup and demolition; Underground Storage Tank (UST) permitting, removal specifications, and closure reporting; soil vapor intrusion investigation and mitigation system design (depressurization systems, etc.); development of groundwater contaminant plume migration models; environmental analysis; and oversight, design and specification generation for remediation operations with contaminants of concern to include polychlorinated biphenyls (PCBs), solvents, mercury, arsenic, petroleum products, asbestos, mold and lead.

SELECTED PROJECTS

- NYCDPR Bushwick Inlet Park (Phase I ESA, Approvals for NYC E-Designation), Brooklyn, NY
- WCS New York Aquarium, Shark Tank and Animal Care Facility (Environmental Remediation), Coney Island, NY
- NYC School Construction Authority (PCB Remediation), Various Locations, New York, NY
- 28-29 High Line (Phase I ESA, Phase II ESI, and Environmental Remediation), New York, NY
- Georgetown Heating Plant (Phase II ESI and Remedial Design for Mercury Impacted Site), Washington D.C.
- 268 West Street (BCP Application, RI and RIWP), New York, NY
- Confidential Multiple Mixed-Use Tower Location (BCP Application, RI, Phase I ESA, and Phase II ESI), New York, NY
- Dock 72 at Brooklyn Navy Yard, (NYS Voluntary Cleanup Program), Brooklyn, NY
- 27-21 44th Drive (BCP Application, Remedial Investigation Phase I ESA, and Phase II ESI), Long Island City, NY
- Purves Street Development, BCP Application, RAWP, and Phase II ESI, Long Island City, NY
- 267-273 West 87th Street (BCP Application, Remedial Investigation, RIWP, RAWP), New York, NY
- International Leadership Charter School (Environmental Remediation), Bronx, NY
- West & Watts (BCP Application), New York, NY
- Hudson Yards Redevelopment (Phase I ESA and Phase II ESI), New York, NY
- 627 Smith Street (RI and Report), Brooklyn, NY

EDUCATION

M.S., Environmental Engineering
Columbia University

B.S., Chemistry, Environmental Toxicology (Business Administration minor)
Humboldt State University

PROFESSIONAL REGISTRATION

Professional Engineer (PE) in NY

LEED Accredited Professional (LEED AP)

Troxler Certification for Nuclear Densometer Training

OSHA 40-Hour HAZWOPER

OSHA HAZWOPER Site Supervisor

AFFILIATIONS

US Green Building Council, NYC Chapter, Communications Committee

Urban Land Institute (ULI), member

Commercial Real Estate Development Associations (NAIOP), member

LANGAN

- Gateway Center II Retail (Phase I ESA and Phase II ESI), Brooklyn, NY
- 261 Hudson Street (Phase I ESA, Phase II ESI, BCP, and RAWP), New York, NY
- Riverside Center, Building 2 (BCP, Phase I ESA and Phase II ESI), New York, NY
- New York Police Academy, (Sub-Slab Depressurization and Vapor Barrier System), College Point, NY
- Bronx Terminal Market (BCP, RIWP, RAWP, Phase I ESA and Phase II ESI), Bronx, NY
- Jacob Javits Convention Center (Phase I ESA and Phase II ESI), New York, NY
- Yankee Stadium Development Waterfront Park (NYSDEC Spill Sites), Bronx, NY
- Silvercup West (BCP, RIWP, RIR, RAWP, and RAA), Long Island City, NY
- 29 Flatbush, Tall Residential Building (Groundwater Studies, RIR and RAWP), Brooklyn, NY
- Gowanus Village I (BCP, RIWP and RIR), Brooklyn, NY
- Sullivan Street Hotel (Site Characterization Study and Owner Representation), New York, NY
- Riker's Island Co-Generation Plant (Soil and Soil Vapor Quality Investigations), Bronx, NY
- The Shops at Atlas Park (Sub-Slab Depressurization and Vapor Barrier Design), Glendale, NY
- Memorial Sloan-Kettering Cancer Center (Subsurface and Soil Vapor Intrusion Investigations), New York, NY
- Element West 59th Street (Oversight and Monitoring of Sub-Slab Depressurization and Vapor Barrier Systems), New York, NY
- Teterboro Airport (Delineation and Remedial Oversight of Petroleum-Contaminated Soils), Teterboro, NJ
- Proposed New York JETS Stadium (Phase I ESA), New York, NY
- Former Con Edison Manufactured Gas Plant Sites (Research Reports), New York, NY
- 7 World Trade Center (Endpoint Sampling and Final Closure Report), New York, NY
- Peter Cooper Village, Environmental Subsurface Investigations, New York, NY
- Greenpoint Terminal Market (BCP), Brooklyn, NY
- Confidential Location (Remediation for Mercury-Contaminated Site), New York, NY
- Confidential Location (Phase II ESI and Remedial Design for Mercury Impacted Site), Brooklyn, NY

NYC Brownfield Partnership, member

SELECTED PUBLICATIONS, REPORTS, AND PRESENTATIONS

NYC Mayor's Office of Environmental Remediation – Big Apple Brownfield Workshop – Presented on Soil Vapor Intrusion Remedies (e.g., SSD Systems, Vapor Barriers, Modified HVAC)

New York City Brownfield Partnership – Presented on environmental considerations and complications of the Hudson Yards Development

Waterfront Development Technical Course – Presented on Impacted Waterfront Planning Considerations

GERALD F. NICHOLLS, PE, CHMM

ASSOCIATE

ENVIRONMENTAL ENGINEERING & HAZARDOUS MATERIALS MANAGMENT

Mr. Nicholls' 19 years of expertise includes management of remediation and site investigations, litigation support, brownfield cleanups, remedial design, industrial hygiene, air monitoring and environmental health and safety projects including data collection, inspection and reporting for projects throughout New York and New Jersey. He works closely with various private, state, commercial, industrial, and municipal clients, acting as a liaison between the client and project team.

In 2019, Real Estate Weekly named Mr. Nicholls one of the Rising Stars of Real Estate.

SELECTED PROJECTS

- 491 Wortman Ave, Air Sparge/Soil Vapor Extraction Design and Implementation, Brownfield Cleanup Program, Bid Documents, Construction Administration, Brooklyn, NY
- Whitehead Realty, Acme Sites, DNAPL Delineation, Site Characterization, Remedial Investigation and Reporting, Brooklyn, NY
- West 17th Street Development, DNAPL Assessment, DNAPL Recovery, Remedial Design, Closure through Brownfield Cleanup Program, Remediation Oversight, Bid Documents, ISS and Containment Wall Design, Construction Administration, New York, NY
- 2 Ingraham Street, Brooklyn, NY
- New York City School Construction Authority On-Call Contract for Hazmat Consulting Services, Various Locations, Five Boroughs of New York, NY
- G4 Capital third party due diligence reviews and environmental risk evaluations, Various Locations, New York, NY
- 140 6th Avenue, Sub-Membrane Depressurization System Design, Spill Remediation, Subslab Remediation and Monitoring Well Piping Design, Remediation Oversight, and Construction Administration, New York, NY
- Gowanus Canal Northside, Demolition and Decommissioning of MOSF, Remediation Investigation, Brownfield Cleanup Program, Brooklyn, NY
- 23-01 42nd Road, Phase I, Phase II Remedial Investigation, Remedial Action Work Plan, Sub-Membrane Depressurization System Design, Underground Storage Tank Closure and Remediation, Brownfield Cleanup Program, Remediation Oversight, Construction Administration, Long Island City, NY
- 23-10 Queens Plaza South, Phase I, Phase II Remedial Investigation, Remedial Action Work Plan, Sub-Membrane Depressurization System Design, Underground Storage Tank Closure and Remediation, Brownfield Cleanup Program, Remediation Oversight, Construction Administration, Long Island City, NY

EDUCATION

M.S., Environmental Engineering
New Jersey Institute of Technology

B.S., Chemistry and Environmental Studies (Double Major)
Ursinus College

PROFESSIONAL REGISTRATION

Professional Engineer (PE) in NY

Certified Hazardous Materials Manager (CHMM)

AFFILIATIONS

Real Estate Board New York

City of Jersey City Environmental Commission, Former Commissioner, Vice Chair and Chair

Alliance of Hazardous Materials Professionals

American Chemical Society

New York League of Conservation Voters

New York City Brownfield Partnership

LANGAN

- 163 6th Street, Phase I and Phase II Due Diligence, Spill Response, Remedial Action Work Plan, Brooklyn, NY
- 170 Amsterdam Avenue, Remedial Action Work Plan, Voluntary Cleanup Program, Remediation Oversight, Construction Administration, New York, NY
- Urban Health Plan, Medical Building, DNAPL Delineation, Remedial Action Work Plan, Hazardous Waste Management and Minimization, Brownfield Cleanup Program, Bronx, NY
- Second Avenue Subway, Air Monitoring and Ventilated Air Treatment Program, New York, NY
- New York University Spill Sites, 4 Washington Square Village, 7-13, Washington Square North, and 251 Mercer Street, Fuel Oil Spill Cleanup and Closure, New York, NY
- Dormitory Authority of New York (DASNY), City College of New York, Fuel Protection and Leak Detection System Repair and Upgrades, New York, NY
- 45 Broad Street, Waste Characterization, Construction Documents, New York, NY
- 241 West 28th Street, New York, NY
- Surfactant Remediation Project, In-Situ Chemical Oxidation Design and Implementation and Site Closure, Margate City, NJ
- Koppers Site, Trans-Hudson Express Project, Kearny, NJ
- Former Cornell Manufacturing Site, Orangeburg, NY
- Horse Pasture Site, Robins Air Force Base, GA
- Williams Air Force Base, Thermal Enhanced Extraction, Mesa, AZ
- New Jersey Transit, 32nd Street Station Stop (former Hicor Site), Bayonne, NJ
- Nikolski Radio Relay Station, Umnak Island, AK
- Middletown Post Office, Due Diligence, Middletown, NY
- Lower Manhattan Construction Command Center, Environmental Services Contract, New York, NY
- Da Nang International Airport, Da Nang, Vietnam
- 22nd to 8th Street Station Light Rail Extension, Bayonne, NJ
- 69th Street Grade Separation Project, North Bergen, NJ
- Dukes Parkway Landfill, Hillsboro/Manville, NJ
- NYU Langone Medical Center, New Science Building, Remediation Oversight and Construction Administration, Voluntary Cleanup Program, New York, NY
- 86 Warren Street, Waste Characterization and Construction Documents, New York, NY
- 459 Smith Street, Due Diligence and Cost Estimating, Brooklyn, NY
- 111 Leroy Street, New York, NY
- 411 Broadway, Phase I, Remedial Investigation, Air/Noise Coordination for E-Designation, New York, NY
- Modera on the Hudson, Remediation Oversight, Remedial Action Work Plan, Submembrane Depressurization System Design, Yonkers, NY
- Honeywell Quanta, Remedial Design Peer Review, Edgewater, NJ
- New York University Tandon School of Engineering (Spill 1009933), Remediation, Laser-Induced Fluorescence Investigation, Remedial System Optimization, Product Recovery, Spill Cleanup, Brooklyn, NY
- 237-261 North 9th Street, Peer Review and Due Diligence, Brooklyn, NY

SELECTED PUBLICATIONS, REPORTS, AND PRESENTATIONS

Burke, M., Ciambruschini, S., Nicholls, G., Tashji, A., Vaidya, S., “Redeveloping a Remediated MGP Site”, MGP Symposium 2019, Atlantic City, NJ.

”Biodegradation Pathways and End Products of Sodium Dioctyl Sulfosuccinate/Sodium Hexadecyl Diphenyl Oxide Disulfonate Surfactant Solution.” Florida Remediation Conference, Orlando, Florida, November 2005.

JOSEPH CONBOY

STAFF CHEMIST

ENVIRONMNETAL

Mr. Conboy has seven years of environmental chemistry, quality assurance, and environmental database management experience, with a current emphasis on validation of laboratory data for submittal to NJDEP via the New Jersey Data of Known Quality Protocols and to NYSDEC. Previous work experience includes performing validation of data for projects in USEPA Regions 2 and 3 while employing appropriate validation guidelines for each region, managing large data sets, updating appropriate regulatory limits, performing statistical evaluations, and preparing electronic data deliverables and report deliverables using the Earthsoft EQuIS database program, and acted as an intermediary between project managers, field staff, and laboratories. Mr. Conboy also has experience in field sampling techniques and maintains current OSHA HAZWOPER certification.

EDUCATION

B.Sc., Chemistry with a minor in Mathematics
Rowan University

CERTIFICATIONS & TRAINING

OSHA 40-Hour HAZWOPER 29 CFR 1910.120(e)(4) Certification

NJ Analytical Guidance and Data Usability Training

USEPA Data Validation Training

Earthsoft EQuIS Environmental Database Training

SELECTED PROJECTS

- 1400 Ferris, Bronx, NY – Completed validation of soil and groundwater data and prepared the Data Usability Summary Report for submittal to NYSDEC. USEPA Region II guidelines, with aide from National Functional Guidelines, were employed to perform validation of VOCs and SVOCs including 1,4-dioxane, and tangentially used based on professional judgment to perform validation of PFAS data.
- Broome Street Parking Lot, NY - Completed validation of waste characterization data and prepared the Data Usability Summary Report for submittal to NYSDEC. USEPA Region II guidelines, with aide from National Functional Guidelines, were employed to perform validation of VOCs, SVOCs, herbicides, PCBs, pesticides, metals including mercury, ignitability temperature, pH, reactive cyanide, reactive sulfide, cyanide, and hexavalent chromium. Toxicity characteristic leachate procedure extraction data for VOCs, SVOCs, herbicides, pesticides, metals, and mercury were also validated.
- 215 North 10th Street, Brooklyn, NY - Completed validation of soil and groundwater data and prepared the Data Usability Summary Report for submittal to NYSDEC. USEPA Region II guidelines, with aide from National Functional Guidelines, were employed to perform validation of VOC, SVOC, SVOC SIM, herbicide, PCB, pesticide, metals, mercury, cyanide, hexavalent chromium, trivalent chromium data.
- 35 Commercial Street, Brooklyn, NY - Completed validation of soil data and prepared the Data Usability Summary Report for submittal to NYSDEC. USEPA Region II guidelines, with aide from National Functional Guidelines, were employed to perform validation of VOC, SVOC, SVOC SIM, herbicide, PCB, pesticide, metals, mercury, cyanide, hexavalent chromium, trivalent chromium data, and tangentially used based on professional judgment to perform validation of PFAS data.
- Suffolk Street, Lower East Side, NY- Completed validation of soil, groundwater, and soil vapor data and prepared the Data Usability Summary Report for submittal to NYSDEC. USEPA Region II

guidelines, with aide from National Functional Guidelines, were employed to perform validation of VOC, VOCs by USEPA TO-15, SVOC, SVOC SIM, herbicide, PCB, pesticide, metals, mercury, cyanide, hexavalent chromium, trivalent chromium data, and tangentially used based on professional judgment to perform validation of PFAS data.

- Managed a database for a confidential client containing 10+ years of environmental chemical data from multiple laboratories, requiring select data validation in accordance with New Jersey Data of Known Quality Protocols and identifying areas of delineation from historic field information. Once identified, NJDEP designated groundwater, surface water, soil, sediment, soil vapor, and custom screening criteria were researched and applied to each area, requiring individualized flagging for reporting.*
- Prepared the New Jersey Data of Known Quality Protocol Data Usability Evaluation and managed the database for a confidential client for a data set greater than 20 years old. A DUE or any validation effort was not prepared in the 20 years prior to current. This included data from variations of methods for volatile organic compounds, semivolatile organic compounds, total and dissolved metals, pesticides, herbicides, natural attenuation parameters, and per- and polyfluoroalkyl substances in multiple media.*
- Performed 200+ Stage 2a validations for a combined 87-acre USEPA designated Corrective Action site under the Resource Conservation and Recovery Act, including a quick-turn USEPA required PCB by soxhlet extraction investigation across multiple plants. Once a former train car painting facility, USEPA required a quick-turn PCB by soxhlet extraction soil investigation.
- Preparation of a quality assurance program for a confidential client in West Virginia. A quick turn QAPP was prepared in a service location new to the consultant, resulting in research into state requirements for data usability and auditing newly employed laboratories. The QAPP was understood to be prepared for groundwater only, but the client did not reveal the need for sediment and soil. Two QAPPs were submitted for review to governing agencies.*
- Used statistical software to determine a localized background upper confidence limit of chromium for a confidential client's sand and gravel site. Validation was used to confirm laboratory procedures, and data was used in ProUCL calculations to compare to researched background chromium levels for Pennsylvania soils. *
- Prepared daily perimeter dust and air monitoring summaries and validation of low level mirex data for a confidential client's superfund site. Low level mirex data was generated by university laboratories and subject to validation following national functional guidelines to aide in river clean-up, including sediment, surface water, and treatment system water matrices.*

**Project completed prior to employment at LANGAN.*

ATTACHMENT C

LABORATORY REPORTING LIMITS AND METHOD DETECTION LIMITS

ATTACHMENT C

SOIL SAMPLES
LABORATORY REPORTING LIMITS AND METHOD DETECTION LIMITS

Date Created: 03/19/24
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Langan Engineering & Environmental

TCL Volatiles - EPA 8260D/5035 High&Low (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - 1 Vial MeOH/2 Vial Water

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Methylene chloride	75-09-2	5	2.29	ug/kg	70-130	30	70-130	30	30			
1,1-Dichloroethane	75-34-3	1	0.145	ug/kg	70-130	30	70-130	30	30			
Chloroform	67-66-3	1.5	0.14	ug/kg	70-130	30	70-130	30	30			
Carbon tetrachloride	56-23-5	1	0.23	ug/kg	70-130	30	70-130	30	30			
1,2-Dichloropropane	78-87-5	1	0.125	ug/kg	70-130	30	70-130	30	30			
Dibromochloromethane	124-48-1	1	0.14	ug/kg	70-130	30	70-130	30	30			
1,1,2-Trichloroethane	79-00-5	1	0.267	ug/kg	70-130	30	70-130	30	30			
Tetrachloroethene	127-18-4	0.5	0.196	ug/kg	70-130	30	70-130	30	30			
Chlorobenzene	108-90-7	0.5	0.127	ug/kg	70-130	30	70-130	30	30			
Trichlorofluoromethane	75-69-4	4	0.695	ug/kg	70-139	30	70-139	30	30			
1,2-Dichloroethane	107-06-2	1	0.257	ug/kg	70-130	30	70-130	30	30			
1,1,1-Trichloroethane	71-55-6	0.5	0.167	ug/kg	70-130	30	70-130	30	30			
Bromodichloromethane	75-27-4	0.5	0.109	ug/kg	70-130	30	70-130	30	30			
trans-1,3-Dichloropropene	10061-02-6	1	0.273	ug/kg	70-130	30	70-130	30	30			
cis-1,3-Dichloropropene	10061-01-5	0.5	0.158	ug/kg	70-130	30	70-130	30	30			
1,3-Dichloropropene, Total	542-75-6	0.5	0.158	ug/kg				30	30			
1,1-Dichloropropene	563-58-6	0.5	0.159	ug/kg	70-130	30	70-130	30	30			
Bromoform	75-25-2	4	0.246	ug/kg	70-130	30	70-130	30	30			
1,1,2,2-Tetrachloroethane	79-34-5	0.5	0.166	ug/kg	70-130	30	70-130	30	30			
Benzene	71-43-2	0.5	0.166	ug/kg	70-130	30	70-130	30	30			
Toluene	108-88-3	1	0.543	ug/kg	70-130	30	70-130	30	30			
Ethylbenzene	100-41-4	1	0.141	ug/kg	70-130	30	70-130	30	30			
Chloromethane	74-87-3	4	0.932	ug/kg	52-130	30	52-130	30	30			
Bromomethane	74-83-9	2	0.581	ug/kg	57-147	30	57-147	30	30			
Vinyl chloride	75-01-4	1	0.335	ug/kg	67-130	30	67-130	30	30			
Chloroethane	75-00-3	2	0.452	ug/kg	50-151	30	50-151	30	30			
1,1-Dichloroethene	75-35-4	1	0.238	ug/kg	65-135	30	65-135	30	30			
trans-1,2-Dichloroethene	156-60-5	1.5	0.137	ug/kg	70-130	30	70-130	30	30			
Trichloroethene	79-01-6	0.5	0.137	ug/kg	70-130	30	70-130	30	30			
1,2-Dichlorobenzene	95-50-1	2	0.144	ug/kg	70-130	30	70-130	30	30			
1,3-Dichlorobenzene	541-73-1	2	0.148	ug/kg	70-130	30	70-130	30	30			
1,4-Dichlorobenzene	106-46-7	2	0.171	ug/kg	70-130	30	70-130	30	30			
Methyl tert butyl ether	1634-04-4	2	0.201	ug/kg	66-130	30	66-130	30	30			
p/m-Xylene	179601-23-1	2	0.56	ug/kg	70-130	30	70-130	30	30			
o-Xylene	95-47-6	1	0.291	ug/kg	70-130	30	70-130	30	30			
Xylene (Total)	1330-20-7	1	0.291	ug/kg				30	30			
cis-1,2-Dichloroethene	156-59-2	1	0.175	ug/kg	70-130	30	70-130	30	30			
1,2-Dichloroethene (total)	540-59-0	1	0.137	ug/kg				30	30			
Dibromomethane	74-95-3	2	0.238	ug/kg	70-130	30	70-130	30	30			
Styrene	100-42-5	1	0.196	ug/kg	70-130	30	70-130	30	30			
Dichlorodifluoromethane	75-71-8	10	0.915	ug/kg	30-146	30	30-146	30	30			
Acetone	67-64-1	10	4.811	ug/kg	54-140	30	54-140	30	30			

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. ***(Soil/Solids only)***
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Langan Engineering & Environmental

TCL Volatiles - EPA 8260D/5035 High&Low (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - 1 Vial MeOH/2 Vial Water

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Carbon disulfide	75-15-0	10	4.55	ug/kg	59-130	30	59-130	30	30			
2-Butanone	78-93-3	10	2.22	ug/kg	70-130	30	70-130	30	30			
Vinyl acetate	108-05-4	10	2.15	ug/kg	70-130	30	70-130	30	30			
4-Methyl-2-pentanone	108-10-1	10	1.28	ug/kg	70-130	30	70-130	30	30			
1,2,3-Trichloropropane	96-18-4	2	0.127	ug/kg	68-130	30	68-130	30	30			
2-Hexanone	591-78-6	10	1.18	ug/kg	70-130	30	70-130	30	30			
Bromochloromethane	74-97-5	2	0.205	ug/kg	70-130	30	70-130	30	30			
2,2-Dichloropropane	594-20-7	2	0.202	ug/kg	70-130	30	70-130	30	30			
1,2-Dibromoethane	106-93-4	1	0.279	ug/kg	70-130	30	70-130	30	30			
1,3-Dichloropropane	142-28-9	2	0.167	ug/kg	69-130	30	69-130	30	30			
1,1,1,2-Tetrachloroethane	630-20-6	0.5	0.132	ug/kg	70-130	30	70-130	30	30			
Bromobenzene	108-86-1	2	0.145	ug/kg	70-130	30	70-130	30	30			
sec-Butylbenzene	135-98-8	1	0.146	ug/kg	70-130	30	70-130	30	30			
tert-Butylbenzene	98-06-6	2	0.118	ug/kg	70-130	30	70-130	30	30			
o-Chlorotoluene	95-49-8	2	0.191	ug/kg	70-130	30	70-130	30	30			
p-Chlorotoluene	106-43-4	2	0.108	ug/kg	70-130	30	70-130	30	30			
1,2-Dibromo-3-chloropropane	96-12-8	3	0.998	ug/kg	68-130	30	68-130	30	30			
Hexachlorobutadiene	87-68-3	4	0.169	ug/kg	67-130	30	67-130	30	30			
Isopropylbenzene	98-82-8	1	0.109	ug/kg	70-130	30	70-130	30	30			
p-Isopropyltoluene	99-87-6	1	0.109	ug/kg	70-130	30	70-130	30	30			
Acrylonitrile	107-13-1	4	1.15	ug/kg	70-130	30	70-130	30	30			
n-Propylbenzene	103-65-1	1	0.171	ug/kg	70-130	30	70-130	30	30			
1,2,3-Trichlorobenzene	87-61-6	2	0.322	ug/kg	70-130	30	70-130	30	30			
1,2,4-Trichlorobenzene	120-82-1	2	0.272	ug/kg	70-130	30	70-130	30	30			
1,3,5-Trimethylbenzene	108-67-8	2	0.193	ug/kg	70-130	30	70-130	30	30			
1,2,4-Trimethylbenzene	95-63-6	2	0.334	ug/kg	70-130	30	70-130	30	30			
1,4-Dioxane	123-91-1	80	35.1	ug/kg	65-136	30	65-136	30	30			
1,4-Diethylbenzene	105-05-5	2	0.177	ug/kg	70-130	30	70-130	30	30			
4-Ethyltoluene	622-96-8	2	0.384	ug/kg	70-130	30	70-130	30	30			
1,2,4,5-Tetramethylbenzene	95-93-2	2	0.191	ug/kg	70-130	30	70-130	30	30			
Ethyl ether	60-29-7	2	0.341	ug/kg	67-130	30	67-130	30	30			
trans-1,4-Dichloro-2-butene	110-57-6	5	1.42	ug/kg	70-130	30	70-130	30	30			
1,2-Dichloroethane-d4	*17060-07-0*									*70-130*		
2-Chloroethoxyethane												
Toluene-d8	*2037-26-5*									*70-130*		
4-Bromofluorobenzene	*460-00-4*									*70-130*		
Dibromofluoromethane	*1868-53-7*									*70-130*		

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NYTCL Semivolatiles - EPA 8270E (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - Glass 250ml/8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Acenaphthene	83-32-9	133.6	17.3012	ug/kg	31-137	50	31-137	50	50			
1,2,4-Trichlorobenzene	120-82-1	167	19.1048	ug/kg	38-107	50	38-107	50	50			
Hexachlorobenzene	118-74-1	100.2	18.704	ug/kg	40-140	50	40-140	50	50			
Bis(2-chloroethyl)ether	111-44-4	150.3	22.6452	ug/kg	40-140	50	40-140	50	50			
2-Chloronaphthalene	91-58-7	167	16.5664	ug/kg	40-140	50	40-140	50	50			
1,2-Dichlorobenzene	95-50-1	167	29.9932	ug/kg	40-140	50	40-140	50	50			
1,3-Dichlorobenzene	541-73-1	167	28.724	ug/kg	40-140	50	40-140	50	50			
1,4-Dichlorobenzene	106-46-7	167	29.1582	ug/kg	28-104	50	28-104	50	50			
3,3'-Dichlorobenzidine	91-94-1	167	44.422	ug/kg	40-140	50	40-140	50	50			
2,4-Dinitrotoluene	121-14-2	167	33.4	ug/kg	40-132	50	40-132	50	50			
2,6-Dinitrotoluene	606-20-2	167	28.6572	ug/kg	40-140	50	40-140	50	50			
Fluoranthene	206-44-0	100.2	19.1716	ug/kg	40-140	50	40-140	50	50			
4-Chlorophenyl phenyl ether	7005-72-3	167	17.869	ug/kg	40-140	50	40-140	50	50			
4-Bromophenyl phenyl ether	101-55-3	167	25.4842	ug/kg	40-140	50	40-140	50	50			
Bis(2-chloroisopropyl)ether	108-60-1	200.4	28.5236	ug/kg	40-140	50	40-140	50	50			
Bis(2-chloroethoxy)methane	111-91-1	180.36	16.7334	ug/kg	40-117	50	40-117	50	50			
Hexachlorobutadiene	87-68-3	167	24.4488	ug/kg	40-140	50	40-140	50	50			
Hexachlorocyclopentadiene	77-47-4	477.62	151.302	ug/kg	40-140	50	40-140	50	50			
Hexachloroethane	67-72-1	133.6	27.0206	ug/kg	40-140	50	40-140	50	50			
Isophorone	78-59-1	150.3	21.6766	ug/kg	40-140	50	40-140	50	50			
Naphthalene	91-20-3	167	20.3406	ug/kg	40-140	50	40-140	50	50			
Nitrobenzene	98-95-3	150.3	24.716	ug/kg	40-140	50	40-140	50	50			
NitrosoDiPhenylAmine(NDPA)/DPA	86-30-6	133.6	19.0046	ug/kg	36-157	50	36-157	50	50			
n-Nitrosodi-n-propylamine	621-64-7	167	25.7848	ug/kg	32-121	50	32-121	50	50			
Bis(2-Ethylhexyl)phthalate	117-81-7	167	57.782	ug/kg	40-140	50	40-140	50	50			
Butyl benzyl phthalate	85-68-7	167	42.084	ug/kg	40-140	50	40-140	50	50			
Di-n-butylphthalate	84-74-2	167	31.6632	ug/kg	40-140	50	40-140	50	50			
Di-n-octylphthalate	117-84-0	167	56.78	ug/kg	40-140	50	40-140	50	50			
Diethyl phthalate	84-66-2	167	15.4642	ug/kg	40-140	50	40-140	50	50			
Dimethyl phthalate	131-11-3	167	35.07	ug/kg	40-140	50	40-140	50	50			
Benzo(a)anthracene	56-55-3	100.2	18.8042	ug/kg	40-140	50	40-140	50	50			
Benzo(a)pyrene	50-32-8	133.6	40.748	ug/kg	40-140	50	40-140	50	50			
Benzo(b)fluoranthene	205-99-2	100.2	28.1228	ug/kg	40-140	50	40-140	50	50			
Benzo(k)fluoranthene	207-08-9	100.2	26.72	ug/kg	40-140	50	40-140	50	50			
Chrysene	218-01-9	100.2	17.368	ug/kg	40-140	50	40-140	50	50			
Acenaphthylene	208-96-8	133.6	25.7848	ug/kg	40-140	50	40-140	50	50			
Anthracene	120-12-7	100.2	32.565	ug/kg	40-140	50	40-140	50	50			
Benzo(ghi)perylene	191-24-2	133.6	19.6392	ug/kg	40-140	50	40-140	50	50			
Fluorene	86-73-7	167	16.2324	ug/kg	40-140	50	40-140	50	50			
Phenanthrene	85-01-8	100.2	20.3072	ug/kg	40-140	50	40-140	50	50			
Dibenzo(a,h)anthracene	53-70-3	100.2	19.3052	ug/kg	40-140	50	40-140	50	50			
Indeno(1,2,3-cd)Pyrene	193-39-5	133.6	23.2798	ug/kg	40-140	50	40-140	50	50			

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NYTCL Semivolatiles - EPA 8270E (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - Glass 250ml/8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Pyrene	129-00-0	100.2	16.5998	ug/kg	35-142	50	35-142	50	50			
Biphenyl	92-52-4	380.76	21.71	ug/kg	37-127	50	37-127	50	50			
4-Chloroaniline	106-47-8	167	30.394	ug/kg	40-140	50	40-140	50	50			
2-Nitroaniline	88-74-4	167	32.1976	ug/kg	47-134	50	47-134	50	50			
3-Nitroaniline	99-09-2	167	31.4962	ug/kg	26-129	50	26-129	50	50			
4-Nitroaniline	100-01-6	167	69.138	ug/kg	41-125	50	41-125	50	50			
Dibenzofuran	132-64-9	167	15.7982	ug/kg	40-140	50	40-140	50	50			
2-Methylnaphthalene	91-57-6	200.4	20.1736	ug/kg	40-140	50	40-140	50	50			
Acetophenone	98-86-2	167	20.6746	ug/kg	14-144	50	14-144	50	50			
2,4,6-Trichlorophenol	88-06-2	100.2	31.6632	ug/kg	30-130	50	30-130	50	50			
P-Chloro-M-Cresol	59-50-7	167	24.883	ug/kg	26-103	50	26-103	50	50			
2-Chlorophenol	95-57-8	167	19.7394	ug/kg	25-102	50	25-102	50	50			
2,4-Dichlorophenol	120-83-2	150.3	26.8536	ug/kg	30-130	50	30-130	50	50			
2,4-Dimethylphenol	105-67-9	167	55.11	ug/kg	30-130	50	30-130	50	50			
2-Nitrophenol	88-75-5	360.72	62.792	ug/kg	30-130	50	30-130	50	50			
4-Nitrophenol	100-02-7	233.8	68.136	ug/kg	11-114	50	11-114	50	50			
2,4-Dinitrophenol	51-28-5	801.6	77.822	ug/kg	4-130	50	4-130	50	50			
4,6-Dinitro-o-cresol	534-52-1	434.2	80.16	ug/kg	10-130	50	10-130	50	50			
Pentachlorophenol	87-86-5	133.6	36.74	ug/kg	17-109	50	17-109	50	50			
Phenol	108-95-2	167	25.217	ug/kg	26-90	50	26-90	50	50			
2-Methylphenol	95-48-7	167	25.885	ug/kg	30-130.	50	30-130.	50	50			
3-Methylphenol/4-Methylphenol	106-44-5	240.48	26.1522	ug/kg	30-130	50	30-130	50	50			
2,4,5-Trichlorophenol	95-95-4	167	31.9972	ug/kg	30-130	50	30-130	50	50			
Benzoic Acid	65-85-0	541.08	169.004	ug/kg	10-110	50	10-110	50	50			
Benzyl Alcohol	100-51-6	167	51.102	ug/kg	40-140	50	40-140	50	50			
Carbazole	86-74-8	167	16.2324	ug/kg	54-128	50	54-128	50	50			
1,4-Dioxane	123-91-1	25.05	7.682	ug/kg	40-140	50	40-140	50	50			
2-Fluorophenol	*367-12-4*									*25-120*		
Phenol-d6	*13127-88-3*									*10-120*		
Nitrobenzene-d5	*4165-60-0*									*23-120*		
2-Fluorobiphenyl	*321-60-8*									*30-120*		
2,4,6-Tribromophenol	*118-79-6*									*10-136*		
4-Terphenyl-d14	*1718-51-0*									*18-120*		

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TCL Pesticides - EPA 8081B (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - Glass 250ml/8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Delta-BHC	319-86-8	1.6008	0.31349	ug/kg	30-150	30	30-150	50	50			
Lindane	58-89-9	0.667	0.298149	ug/kg	30-150	30	30-150	50	50			
Alpha-BHC	319-84-6	0.667	0.189428	ug/kg	30-150	30	30-150	50	50			
Beta-BHC	319-85-7	1.6008	0.60697	ug/kg	30-150	30	30-150	50	50			
Heptachlor	76-44-8	0.8004	0.358846	ug/kg	30-150	30	30-150	50	50			
Aldrin	309-00-2	1.6008	0.563615	ug/kg	30-150	30	30-150	50	50			
Heptachlor epoxide	1024-57-3	3.0015	0.90045	ug/kg	30-150	30	30-150	50	50			
Endrin	72-20-8	0.667	0.27347	ug/kg	30-150	30	30-150	50	50			
Endrin aldehyde	7421-93-4	2.001	0.70035	ug/kg	30-150	30	30-150	50	50			
Endrin ketone	53494-70-5	1.6008	0.412206	ug/kg	30-150	30	30-150	50	50			
Dieldrin	60-57-1	1.0005	0.50025	ug/kg	30-150	30	30-150	50	50			
4,4'-DDE	72-55-9	1.6008	0.370185	ug/kg	30-150	30	30-150	50	50			
4,4'-DDD	72-54-8	1.6008	0.570952	ug/kg	30-150	30	30-150	50	50			
4,4'-DDT	50-29-3	1.6008	1.28731	ug/kg	30-150	30	30-150	50	50			
Endosulfan I	959-98-8	1.6008	0.378189	ug/kg	30-150	30	30-150	50	50			
Endosulfan II	33213-65-9	1.6008	0.534934	ug/kg	30-150	30	30-150	50	50			
Endosulfan sulfate	1031-07-8	0.667	0.317492	ug/kg	30-150	30	30-150	50	50			
Methoxychlor	72-43-5	3.0015	0.9338	ug/kg	30-150	30	30-150	50	50			
Toxaphene	8001-35-2	30.015	8.4042	ug/kg	30-150	30	30-150	50	50			
cis-Chlordane	5103-71-9	2.001	0.557612	ug/kg	30-150	30	30-150	50	50			
trans-Chlordane	5103-74-2	2.001	0.528264	ug/kg	30-150	30	30-150	50	50			
Chlordane	57-74-9	13.34	5.30265	ug/kg	30-150	30	30-150	50	50			
2,4,5,6-Tetrachloro-m-xylene	*877-09-8*									*30-150*		
Decachlorobiphenyl	*2051-24-3*									*30-150*		

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Herbicides -EPA 8151A (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - Glass 250ml/8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
2,4-D	94-75-7	0.1665	0.0104895	mg/kg	30-150	30	30-150	30	30			
2,4,5-T	93-76-5	0.1665	0.0051615	mg/kg	30-150	30	30-150	30	30			
2,4,5-TP (Silvex)	93-72-1	0.1665	0.0044289	mg/kg	30-150	30	30-150	30	30			
DCAA	*19719-28-9*									*30-150*		

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TCL PCBs - EPA 8082A (SOIL)

Holding Time: 365 days
Container/Sample Preservation: 1 - Glass 250ml/8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Aroclor 1016	12674-11-2	50	4.44	ug/kg	40-140	50	40-140	50	50			
Aroclor 1221	11104-28-2	50	5.01	ug/kg	40-140	50	40-140	50	50			
Aroclor 1232	11141-16-5	50	10.6	ug/kg	40-140	50	40-140	50	50			
Aroclor 1242	53469-21-9	50	6.74	ug/kg	40-140	50	40-140	50	50			
Aroclor 1248	12672-29-6	50	7.5	ug/kg	40-140	50	40-140	50	50			
Aroclor 1254	11097-69-1	50	5.47	ug/kg	40-140	50	40-140	50	50			
Aroclor 1260	11096-82-5	50	9.24	ug/kg	40-140	50	40-140	50	50			
Aroclor 1262	37324-23-5	50	6.35	ug/kg	40-140	50	40-140	50	50			
Aroclor 1268	11100-14-4	50	5.18	ug/kg	40-140	50	40-140	50	50			
PCBs, Total	1336-36-3	50	4.44	ug/kg				50	50			
2,4,5,6-Tetrachloro-m-xylene	*877-09-8*									*30-150*		
Decachlorobiphenyl	*2051-24-3*									*30-150*		

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METALS by 6010D (SOIL)

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria	Holding Time	Container
Aluminum, Total	7429-90-5	4	1.08	mg/kg	48-151		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Antimony, Total	7440-36-0	2	0.152	mg/kg	1-208		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Arsenic, Total	7440-38-2	0.4	0.0832	mg/kg	79-121		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Barium, Total	7440-39-3	0.4	0.0696	mg/kg	83-117		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Beryllium, Total	7440-41-7	0.2	0.0132	mg/kg	83-117		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Cadmium, Total	7440-43-9	0.4	0.0392	mg/kg	83-117		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Calcium, Total	7440-70-2	4	1.4	mg/kg	81-119		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Chromium, Total	7440-47-3	0.4	0.0384	mg/kg	80-120		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Cobalt, Total	7440-48-4	0.8	0.0664	mg/kg	84-115		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Copper, Total	7440-50-8	0.4	0.1032	mg/kg	81-118		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Iron, Total	7439-89-6	2	0.3612	mg/kg	45-155		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Lead, Total	7439-92-1	2	0.1072	mg/kg	81-117		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Magnesium, Total	7439-95-4	4	0.616	mg/kg	76-124		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Manganese, Total	7439-96-5	0.4	0.0636	mg/kg	81-117		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Nickel, Total	7440-02-0	1	0.0968	mg/kg	83-117		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Potassium, Total	7440-09-7	100	5.76	mg/kg	71-129		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Selenium, Total	7782-49-2	0.8	0.1032	mg/kg	78-122		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Silver, Total	7440-22-4	0.2	0.1132	mg/kg	75-124		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Sodium, Total	7440-23-5	80	1.26	mg/kg	72-127		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Thallium, Total	7440-28-0	0.8	0.126	mg/kg	80-120		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Vanadium, Total	7440-62-2	0.4	0.0812	mg/kg	78-122		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved
Zinc, Total	7440-66-6	2	0.1172	mg/kg	82-118		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserved

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METALS by 7471B (SOIL)

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria	Holding Time	Container
Mercury, Total	7439-97-6	0.08	0.05216	mg/kg	72-128		80-120	20	20		28 days	Metals Only-Glass 60mL/2oz unpreserved

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WETCHEM (SOIL)

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Method	Holding Time	Container
Chromium, Hexavalent	18540-29-9	0.8	0.16	mg/kg	80-120	20	75-125	20	20	7196A	30 days	1 - Glass 120ml/4oz unpreserved
Cyanide, Total	57-12-5	1	0.212	mg/kg	80-120	35	75-125	35	35	9010C/9012B	14 days	1 - Glass 250ml/8oz unpreserved

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PFAAs via EPA 1633 (Draft) (SOIL)

Holding Time: 90 days
Container/Sample Preservation: 1 - Plastic 8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Perfluorobutanoic Acid (PFBA)	375-22-4	0.8	0.0504	ng/g	40-150	30	40-150	30	30			
Perfluoropentanoic Acid (PFPeA)	2706-90-3	0.4	0.056	ng/g	40-150	30	40-150	30	30			
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	0.2	0.0432	ng/g	40-150	30	40-150	30	30			
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	757124-72-4	0.8	0.0808	ng/g	40-150	30	40-150	30	30			
Perfluorohexanoic Acid (PFHxA)	307-24-4	0.2	0.0464	ng/g	40-150	30	40-150	30	30			
Perfluoropentanesulfonic Acid (PFPeS)	2706-91-4	0.2	0.0232	ng/g	40-150	30	40-150	30	30			
Perfluoroheptanoic Acid (PFHpA)	375-85-9	0.2	0.0232	ng/g	40-150	30	40-150	30	30			
Perfluorohexanesulfonic Acid (PFHxS)	355-46-4	0.2	0.0592	ng/g	40-150	30	40-150	30	30			
Perfluorooctanoic Acid (PFOA)	335-67-1	0.2	0.052	ng/g	40-150	30	40-150	30	30			
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	27619-97-2	0.8	0.28	ng/g	40-150	30	40-150	30	30			
Perfluoroheptanesulfonic Acid (PFHpS)	375-92-8	0.2	0.0368	ng/g	40-150	30	40-150	30	30			
Perfluorononanoic Acid (PFNA)	375-95-1	0.2	0.0784	ng/g	40-150	30	40-150	30	30			
Perfluorooctanesulfonic Acid (PFOS)	1763-23-1	0.2	0.0792	ng/g	40-150	30	40-150	30	30			
Perfluorodecanoic Acid (PFDA)	335-76-2	0.2	0.0752	ng/g	40-150	30	40-150	30	30			
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	39108-34-4	0.8	0.3872	ng/g	40-150	30	40-150	30	30			
Perfluorononanesulfonic Acid (PFNS)	68259-12-1	0.2	0.0424	ng/g	40-150	30	40-150	30	30			
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA	2355-31-9	0.2	0.1	ng/g	40-150	30	40-150	30	30			
Perfluoroundecanoic Acid (PFUnA)	2058-94-8	0.2	0.0512	ng/g	40-150	30	40-150	30	30			
Perfluorodecanesulfonic Acid (PFDS)	335-77-3	0.2	0.032	ng/g	40-150	30	40-150	30	30			
Perfluorooctanesulfonamide (FOSA)	754-91-6	0.2	0.0432	ng/g	40-150	30	40-150	30	30			
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	2991-50-6	0.2	0.0824	ng/g	40-150	30	40-150	30	30			
Perfluorododecanoic Acid (PFDoA)	307-55-1	0.2	0.0408	ng/g	40-150	30	40-150	30	30			
Perfluorotridecanoic Acid (PFTrDA)	72629-94-8	0.2	0.0528	ng/g	40-150	30	40-150	30	30			
Perfluorotetradecanoic Acid (PFTA)	376-06-7	0.2	0.1064	ng/g	40-150	30	40-150	30	30			
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Pro	13252-13-6	0.8	0.0984	ng/g	40-150	30	40-150	30	30			
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	919005-14-4	0.8	0.1464	ng/g	40-150	30	40-150	30	30			
Perfluorododecane Sulfonic Acid (PFDoDS)	79780-39-5	0.2	0.0384	ng/g	40-150	30	40-150	30	30			
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3	756426-58-1	0.8	0.196	ng/g	40-150	30	40-150	30	30			
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-	763051-92-9	0.8	0.1672	ng/g	40-150	30	40-150	30	30			
N-Methyl Perfluorooctane Sulfonamide (NMeFOSA)	31506-32-8	0.2	0.1	ng/g	40-150	30	40-150	30	30			
N-Ethyl Perfluorooctane Sulfonamide (NEtFOSA)	4151-50-2	0.2	0.112	ng/g	40-150	30	40-150	30	30			
N-Methyl Perfluorooctanesulfonamido Ethanol (NMeFOSE)	24448-09-7	2	0.2504	ng/g	40-150	30	40-150	30	30			
N-Ethyl Perfluorooctanesulfonamido Ethanol (NEtFOSE)	1691-99-2	2	0.5104	ng/g	40-150	30	40-150	30	30			
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	377-73-1	0.4	0.0408	ng/g	40-150	30	40-150	30	30			
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	863090-89-5	0.4	0.0312	ng/g	40-150	30	40-150	30	30			
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEESA)	113507-82-7	0.4	0.0832	ng/g	40-150	30	40-150	30	30			
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	151772-58-6	0.4	0.0952	ng/g	40-150	30	40-150	30	30			
3-Perfluoropropyl Propanoic Acid (3:3FTCA)	356-02-5	1	0.144	ng/g	40-150	30	40-150	30	30			
2H,2H,3H,3H-Perfluorooctanoic Acid (5:3FTCA)	914637-49-3	5	0.5048	ng/g	40-150	30	40-150	30	30			
3-Perfluoroheptyl Propanoic Acid (7:3FTCA)	812-70-4	5	1.76	ng/g	40-150	30	40-150	30	30			
Perfluoro[13C4]Butanoic Acid (MPFBA)	*NONE*									*20-150*		
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	*NONE*									*20-150*		

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PFAAs via EPA 1633 (Draft) (SOIL)

Holding Time: 90 days
Container/Sample Preservation: 1 - Plastic 8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	*NONE*									*20-150*		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4	*NONE*									*20-150*		
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	*NONE*									*20-150*		
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	*NONE*									*20-150*		
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	*NONE*									*20-150*		
Perfluoro[13C8]Octanoic Acid (M8PFOA)	*NONE*									*20-150*		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6	*NONE*									*20-150*		
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	*NONE*									*20-150*		
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	*NONE*									*20-150*		
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	*NONE*									*20-150*		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8	*NONE*									*20-150*		
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (	*NONE*									*20-150*		
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	*NONE*									*20-150*		
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	*NONE*									*20-150*		
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d	*NONE*									*20-150*		
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	*NONE*									*20-150*		
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	*NONE*									*20-150*		
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13	*NONE*									*20-150*		
N-Methyl-d3-Perfluoro-1-Octanesulfonamide (d3-NMeFOSA)	*NONE*									*20-150*		
N-Ethyl-d5-Perfluoro-1-Octanesulfonamide (d5-NEtFOSA)	*NONE*									*20-150*		
2-(N-Methyl-d3-Perfluoro-1-Octanesulfonamido)ethan-d4-ol	*1265205-95-5*									*20-150*		
2-(N-Ethyl-d5-Perfluoro-1-Octanesulfonamido)ethan-d4-ol (d	*NONE*									*20-150*		

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TPH by GC-FID Quantitation Only (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - Glass 250ml/8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
TPH (C10-C36)	NONE	33350	3835.25	ug/kg	40-140	40	40-140	40	40			
o-Terphenyl	*84-15-1*									*40-140*		

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Langan Engineering & Environmental

TPH - Gasoline Range Organics (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - Vial MeOH preserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Gasoline Range Organics	NONE	2500	1450	ug/kg	80-120	20	80-120	20	20			
1,1,1-Trifluorotoluene	*98-08-8*									*70-130*		
4-Bromofluorobenzene	*460-00-4*									*70-130*		

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ATTACHMENT B

GROUNDWATER SAMPLES
LABORATORY REPORTING LIMITS AND METHOD DETECTION LIMITS

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TCL Volatiles - EPA 8260D (WATER)

Holding Time: 14 days
Container/Sample Preservation: 3 - Vial HCl preserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Methylene chloride	75-09-2	5	0.5393	ug/l	70-130	20	70-130	20	20			
1,1-Dichloroethane	75-34-3	0.75	0.2156	ug/l	70-130	20	70-130	20	20			
Chloroform	67-66-3	0.75	0.1978	ug/l	70-130	20	70-130	20	20			
Carbon tetrachloride	56-23-5	0.5	0.1652	ug/l	63-132	20	63-132	20	20			
1,2-Dichloropropane	78-87-5	1.75	0.2958	ug/l	70-130	20	70-130	20	20			
Dibromochloromethane	124-48-1	0.5	0.1895	ug/l	63-130	20	63-130	20	20			
1,1,2-Trichloroethane	79-00-5	0.75	0.2615	ug/l	70-130	20	70-130	20	20			
Tetrachloroethene	127-18-4	0.5	0.1813	ug/l	70-130	20	70-130	20	20			
Chlorobenzene	108-90-7	0.5	0.1925	ug/l	75-130	20	75-130	20	20			
Trichlorofluoromethane	75-69-4	2.5	0.2667	ug/l	62-150	20	62-150	20	20			
1,2-Dichloroethane	107-06-2	0.5	0.1595	ug/l	70-130	20	70-130	20	20			
1,1,1-Trichloroethane	71-55-6	0.5	0.158	ug/l	67-130	20	67-130	20	20			
Bromodichloromethane	75-27-4	0.5	0.1924	ug/l	67-130	20	67-130	20	20			
trans-1,3-Dichloropropene	10061-02-6	0.5	0.1643	ug/l	70-130	20	70-130	20	20			
cis-1,3-Dichloropropene	10061-01-5	0.5	0.1436	ug/l	70-130	20	70-130	20	20			
1,1-Dichloropropene	563-58-6	2.5	0.2559	ug/l	70-130	20	70-130	20	20			
Bromoform	75-25-2	2	0.2477	ug/l	54-136	20	54-136	20	20			
1,1,2,2-Tetrachloroethane	79-34-5	0.5	0.1915	ug/l	67-130	20	67-130	20	20			
Benzene	71-43-2	0.5	0.194	ug/l	70-130	20	70-130	20	20			
Toluene	108-88-3	0.75	0.2269	ug/l	70-130	20	70-130	20	20			
Ethylbenzene	100-41-4	0.5	0.265	ug/l	70-130	20	70-130	20	20			
Chloromethane	74-87-3	2.5	0.2815	ug/l	64-130	20	64-130	20	20			
Bromomethane	74-83-9	1	0.2563	ug/l	39-139	20	39-139	20	20			
Vinyl chloride	75-01-4	1	0.2241	ug/l	55-140	20	55-140	20	20			
Chloroethane	75-00-3	1	0.2335	ug/l	55-138	20	55-138	20	20			
1,1-Dichloroethene	75-35-4	0.5	0.1811	ug/l	61-145	20	61-145	20	20			
trans-1,2-Dichloroethene	156-60-5	0.75	0.2108	ug/l	70-130	20	70-130	20	20			
Trichloroethene	79-01-6	0.5	0.1746	ug/l	70-130	20	70-130	20	20			
1,2-Dichlorobenzene	95-50-1	2.5	0.1836	ug/l	70-130	20	70-130	20	20			
1,3-Dichlorobenzene	541-73-1	2.5	0.1863	ug/l	70-130	20	70-130	20	20			
1,4-Dichlorobenzene	106-46-7	2.5	0.215	ug/l	70-130	20	70-130	20	20			
Methyl tert butyl ether	1634-04-4	1	0.16	ug/l	63-130	20	63-130	20	20			
p/m-Xylene	179601-23-1	1	0.3477	ug/l	70-130	20	70-130	20	20			
o-Xylene	95-47-6	1	0.3297	ug/l	70-130	20	70-130	20	20			
cis-1,2-Dichloroethene	156-59-2	0.5	0.1866	ug/l	70-130	20	70-130	20	20			
Dibromomethane	74-95-3	5	0.3633	ug/l	70-130	20	70-130	20	20			
1,2,3-Trichloropropane	96-18-4	5	0.4275	ug/l	64-130	20	64-130	20	20			
Acrylonitrile	107-13-1	5	0.4297	ug/l	70-130	20	70-130	20	20			
Styrene	100-42-5	1	0.3591	ug/l	70-130	20	70-130	20	20			
Dichlorodifluoromethane	75-71-8	5	0.2999	ug/l	36-147	20	36-147	20	20			
Acetone	67-64-1	5	1.5606	ug/l	58-148	20	58-148	20	20			
Carbon disulfide	75-15-0	5	0.2995	ug/l	51-130	20	51-130	20	20			

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TCL Volatiles - EPA 8260D (WATER)

Holding Time: 14 days
Container/Sample Preservation: 3 - Vial HCl preserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
2-Butanone	78-93-3	5	1.9386	ug/l	63-138	20	63-138	20	20			
Vinyl acetate	108-05-4	5	0.3111	ug/l	70-130	20	70-130	20	20			
4-Methyl-2-pentanone	108-10-1	5	0.4162	ug/l	59-130	20	59-130	20	20			
2-Hexanone	591-78-6	5	0.5783	ug/l	57-130	20	57-130	20	20			
Bromochloromethane	74-97-5	2.5	0.3295	ug/l	70-130	20	70-130	20	20			
2,2-Dichloropropane	594-20-7	2.5	0.3975	ug/l	63-133	20	63-133	20	20			
1,2-Dibromoethane	106-93-4	2	0.1929	ug/l	70-130	20	70-130	20	20			
1,3-Dichloropropane	142-28-9	2.5	0.2122	ug/l	70-130	20	70-130	20	20			
1,1,1,2-Tetrachloroethane	630-20-6	0.5	0.1652	ug/l	64-130	20	64-130	20	20			
Bromobenzene	108-86-1	2.5	0.1837	ug/l	70-130	20	70-130	20	20			
n-Butylbenzene	104-51-8	0.5	0.1961	ug/l	53-136	20	53-136	20	20			
sec-Butylbenzene	135-98-8	0.5	0.1806	ug/l	70-130	20	70-130	20	20			
tert-Butylbenzene	98-06-6	2.5	0.3016	ug/l	70-130	20	70-130	20	20			
o-Chlorotoluene	95-49-8	2.5	0.1823	ug/l	70-130	20	70-130	20	20			
p-Chlorotoluene	106-43-4	2.5	0.1847	ug/l	70-130	20	70-130	20	20			
1,2-Dibromo-3-chloropropane	96-12-8	2.5	0.327	ug/l	41-144	20	41-144	20	20			
Hexachlorobutadiene	87-68-3	0.6	0.2301	ug/l	63-130	20	63-130	20	20			
Isopropylbenzene	98-82-8	0.5	0.187	ug/l	70-130	20	70-130	20	20			
p-Isopropyltoluene	99-87-6	0.5	0.1885	ug/l	70-130	20	70-130	20	20			
Naphthalene	91-20-3	2.5	0.2174	ug/l	70-130	20	70-130	20	20			
n-Propylbenzene	103-65-1	0.5	0.1734	ug/l	69-130	20	69-130	20	20			
1,2,3-Trichlorobenzene	87-61-6	2.5	0.2338	ug/l	70-130	20	70-130	20	20			
1,2,4-Trichlorobenzene	120-82-1	2.5	0.2197	ug/l	70-130	20	70-130	20	20			
1,3,5-Trimethylbenzene	108-67-8	2.5	0.2105	ug/l	64-130	20	64-130	20	20			
1,2,4-Trimethylbenzene	95-63-6	2.5	0.2678	ug/l	70-130	20	70-130	20	20			
1,4-Dioxane	123-91-1	250	75.7059	ug/l	56-162	20	56-162	20	20			
1,4-Diethylbenzene	105-05-5	2	0.1084	ug/l	70-130	20	70-130	20	20			
4-Ethyltoluene	622-96-8	2	0.4162	ug/l	70-130	20	70-130	20	20			
1,2,4,5-Tetramethylbenzene	95-93-2	2	0.0965	ug/l	70-130	20	70-130	20	20			
Ethyl ether	60-29-7	2.5	0.2045	ug/l	59-134	20	59-134	20	20			
trans-1,4-Dichloro-2-butene	110-57-6	2.5	0.1733	ug/l	70-130	20	70-130	20	20			
1,2-Dichloroethane-d4	*17060-07-0*									*70-130*		
Toluene-d8	*2037-26-5*									*70-130*		
4-Bromofluorobenzene	*460-00-4*									*70-130*		
Dibromofluoromethane	*1868-53-7*									*70-130*		

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NYTCL Semivolatiles - EPA 8270E (LVI) (WATER)

Holding Time: 7 days
Container/Sample Preservation: 2 - Amber 250ml unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Acenaphthene	83-32-9	2.002	0.44408	ug/l	37-111	30	37-111	30	30			
1,2,4-Trichlorobenzene	120-82-1	5.0232	0.49868	ug/l	39-98	30	39-98	30	30			
Hexachlorobenzene	118-74-1	2.002	0.46592	ug/l	40-140	30	40-140	30	30			
Bis(2-chloroethyl)ether	111-44-4	2.002	0.50596	ug/l	40-140	30	40-140	30	30			
2-Chloronaphthalene	91-58-7	2.002	0.4368	ug/l	40-140	30	40-140	30	30			
1,2-Dichlorobenzene	95-50-1	2.002	0.455	ug/l	40-140	30	40-140	30	30			
1,3-Dichlorobenzene	541-73-1	2.002	0.40404	ug/l	40-140	30	40-140	30	30			
1,4-Dichlorobenzene	106-46-7	2.002	0.43316	ug/l	36-97	30	36-97	30	30			
3,3'-Dichlorobenzidine	91-94-1	5.0232	1.62344	ug/l	40-140	30	40-140	30	30			
2,4-Dinitrotoluene	121-14-2	5.0232	1.1648	ug/l	48-143	30	48-143	30	30			
2,6-Dinitrotoluene	606-20-2	5.0232	0.93184	ug/l	40-140	30	40-140	30	30			
Fluoranthene	206-44-0	2.002	0.257348	ug/l	40-140	30	40-140	30	30			
4-Chlorophenyl phenyl ether	7005-72-3	2.002	0.48776	ug/l	40-140	30	40-140	30	30			
4-Bromophenyl phenyl ether	101-55-3	2.002	0.37856	ug/l	40-140	30	40-140	30	30			
Bis(2-chloroisopropyl)ether	108-60-1	2.002	0.5278	ug/l	40-140	30	40-140	30	30			
Bis(2-chloroethoxy)methane	111-91-1	5.0232	0.50232	ug/l	40-140	30	40-140	30	30			
Hexachlorobutadiene	87-68-3	2.002	0.65884	ug/l	40-140	30	40-140	30	30			
Hexachlorocyclopentadiene	77-47-4	20.02	0.68796	ug/l	40-140	30	40-140	30	30			
Hexachloroethane	67-72-1	2.002	0.58604	ug/l	40-140	30	40-140	30	30			
Isophorone	78-59-1	5.0232	1.20484	ug/l	40-140	30	40-140	30	30			
Naphthalene	91-20-3	2.002	0.46592	ug/l	40-140	30	40-140	30	30			
Nitrobenzene	98-95-3	2.002	0.77168	ug/l	40-140	30	40-140	30	30			
NitrosoDiPhenylAmine(NDPA)/DPA	86-30-6	2.002	0.4186	ug/l	40-140	30	40-140	30	30			
n-Nitrosodi-n-propylamine	621-64-7	5.0232	0.64428	ug/l	29-132	30	29-132	30	30			
Bis(2-Ethylhexyl)phthalate	117-81-7	3.003	1.53608	ug/l	40-140	30	40-140	30	30			
Butyl benzyl phthalate	85-68-7	5.0232	1.17208	ug/l	40-140	30	40-140	30	30			
Di-n-butylphthalate	84-74-2	5.0232	0.38948	ug/l	40-140	30	40-140	30	30			
Di-n-octylphthalate	117-84-0	5.0232	1.274	ug/l	40-140	30	40-140	30	30			
Diethyl phthalate	84-66-2	5.0232	0.3822	ug/l	40-140	30	40-140	30	30			
Dimethyl phthalate	131-11-3	5.0232	1.82	ug/l	40-140	30	40-140	30	30			
Benzo(a)anthracene	56-55-3	2.002	0.32578	ug/l	40-140	30	40-140	30	30			
Benzo(a)pyrene	50-32-8	2.002	0.40768	ug/l	40-140	30	40-140	30	30			
Benzo(b)fluoranthene	205-99-2	2.002	0.355264	ug/l	40-140	30	40-140	30	30			
Benzo(k)fluoranthene	207-08-9	2.002	0.37492	ug/l	40-140	30	40-140	30	30			
Chrysene	218-01-9	2.002	0.341068	ug/l	40-140	30	40-140	30	30			
Acenaphthylene	208-96-8	2.002	0.46592	ug/l	45-123	30	45-123	30	30			
Anthracene	120-12-7	2.002	0.32942	ug/l	40-140	30	40-140	30	30			
Benzo(ghi)perylene	191-24-2	2.002	0.296296	ug/l	40-140	30	40-140	30	30			
Fluorene	86-73-7	2.002	0.41496	ug/l	40-140	30	40-140	30	30			
Phenanthrene	85-01-8	2.002	0.33124	ug/l	40-140	30	40-140	30	30			
Dibenzo(a,h)anthracene	53-70-3	2.002	0.323232	ug/l	40-140	30	40-140	30	30			
Indeno(1,2,3-cd)Pyrene	193-39-5	2.002	0.39676	ug/l	40-140	30	40-140	30	30			

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Langan Engineering & Environmental

NYTCL Semivolatiles - EPA 8270E (LVI) (WATER)

Holding Time: 7 days
Container/Sample Preservation: 2 - Amber 250ml unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Pyrene	129-00-0	2.002	0.279552	ug/l	26-127	30	26-127	30	30			
Biphenyl	92-52-4	2.002	0.45864	ug/l	40-140	30	40-140	30	30			
4-Chloroaniline	106-47-8	5.0232	1.07016	ug/l	40-140	30	40-140	30	30			
2-Nitroaniline	88-74-4	5.0232	0.49868	ug/l	52-143	30	52-143	30	30			
3-Nitroaniline	99-09-2	5.0232	0.81536	ug/l	25-145	30	25-145	30	30			
4-Nitroaniline	100-01-6	5.0232	0.8008	ug/l	51-143	30	51-143	30	30			
Dibenzofuran	132-64-9	2.002	0.49868	ug/l	40-140	30	40-140	30	30			
2-Methylnaphthalene	91-57-6	2.002	0.455	ug/l	40-140	30	40-140	30	30			
Acetophenone	98-86-2	5.0232	0.5278	ug/l	39-129	30	39-129	30	30			
2,4,6-Trichlorophenol	88-06-2	5.0232	0.61152	ug/l	30-130	30	30-130	30	30			
P-Chloro-M-Cresol	59-50-7	2.002	0.35126	ug/l	23-97	30	23-97	30	30			
2-Chlorophenol	95-57-8	2.002	0.48048	ug/l	27-123	30	27-123	30	30			
2,4-Dichlorophenol	120-83-2	5.0232	0.41132	ug/l	30-130	30	30-130	30	30			
2,4-Dimethylphenol	105-67-9	5.0232	1.77996	ug/l	30-130	30	30-130	30	30			
2-Nitrophenol	88-75-5	10.01	0.84812	ug/l	30-130	30	30-130	30	30			
4-Nitrophenol	100-02-7	10.01	0.6734	ug/l	10-80	30	10-80	30	30			
2,4-Dinitrophenol	51-28-5	20.02	6.6612	ug/l	20-130	30	20-130	30	30			
4,6-Dinitro-o-cresol	534-52-1	10.01	1.81636	ug/l	20-164	30	20-164	30	30			
Pentachlorophenol	87-86-5	10.01	1.79452	ug/l	9-103	30	9-103	30	30			
Phenol	108-95-2	5.0232	0.56784	ug/l	12-110	30	12-110	30	30			
2-Methylphenol	95-48-7	5.0232	0.4914	ug/l	30-130	30	30-130	30	30			
3-Methylphenol/4-Methylphenol	106-44-5	5.0232	0.48048	ug/l	30-130	30	30-130	30	30			
2,4,5-Trichlorophenol	95-95-4	5.0232	0.77532	ug/l	30-130	30	30-130	30	30			
Benzoic Acid	65-85-0	50.232	2.66084	ug/l	10-164	30	10-164	30	30			
Benzyl Alcohol	100-51-6	2.002	0.58968	ug/l	26-116	30	26-116	30	30			
Carbazole	86-74-8	2.002	0.4914	ug/l	55-144	30	55-144	30	30			
2-Fluorophenol	*367-12-4*									*21-120*		
Phenol-d6	*13127-88-3*									*10-120*		
Nitrobenzene-d5	*4165-60-0*									*23-120*		
2-Fluorobiphenyl	*321-60-8*									*15-120*		
2,4,6-Tribromophenol	*118-79-6*									*10-120*		
4-Terphenyl-d14	*1718-51-0*									*41-149*		

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Langan Engineering & Environmental

NYTCL Semivolatiles -EPA 8270E-SIM (LVI) (WATER)

Holding Time: 7 days
Container/Sample Preservation: 2 - Amber 250ml unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Acenaphthene	83-32-9	0.1001	0.01442168	ug/l	40-140	40	40-140	40	40			
2-Chloronaphthalene	91-58-7	0.2002	0.01804712	ug/l	40-140	40	40-140	40	40			
Fluoranthene	206-44-0	0.1001	0.02054052	ug/l	40-140	40	40-140	40	40			
Hexachlorobutadiene	87-68-3	0.5005	0.04674852	ug/l	40-140	40	40-140	40	40			
Naphthalene	91-20-3	0.1001	0.04882696	ug/l	40-140	40	40-140	40	40			
Benzo(a)anthracene	56-55-3	0.1001	0.0198198	ug/l	40-140	40	40-140	40	40			
Benzo(a)pyrene	50-32-8	0.1001	0.01493856	ug/l	40-140	40	40-140	40	40			
Benzo(b)fluoranthene	205-99-2	0.1001	0.01156792	ug/l	40-140	40	40-140	40	40			
Benzo(k)fluoranthene	207-08-9	0.1001	0.00889616	ug/l	40-140	40	40-140	40	40			
Chrysene	218-01-9	0.1001	0.01198288	ug/l	40-140	40	40-140	40	40			
Acenaphthylene	208-96-8	0.1001	0.01222676	ug/l	40-140	40	40-140	40	40			
Anthracene	120-12-7	0.1001	0.01450176	ug/l	40-140	40	40-140	40	40			
Benzo(ghi)perylene	191-24-2	0.1001	0.01365	ug/l	40-140	40	40-140	40	40			
Fluorene	86-73-7	0.1001	0.01456364	ug/l	40-140	40	40-140	40	40			
Phenanthrene	85-01-8	0.1001	0.02333604	ug/l	40-140	40	40-140	40	40			
Dibenzo(a,h)anthracene	53-70-3	0.1001	0.0127218	ug/l	40-140	40	40-140	40	40			
Indeno(1,2,3-cd)Pyrene	193-39-5	0.1001	0.01217216	ug/l	40-140	40	40-140	40	40			
Pyrene	129-00-0	0.1001	0.01902264	ug/l	40-140	40	40-140	40	40			
2-Methylnaphthalene	91-57-6	0.1001	0.02192372	ug/l	40-140	40	40-140	40	40			
Pentachlorophenol	87-86-5	0.8008	0.0143416	ug/l	40-140	40	40-140	40	40			
Hexachlorobenzene	118-74-1	0.8008	0.00938028	ug/l	40-140	40	40-140	40	40			
Hexachloroethane	67-72-1	0.8008	0.06320132	ug/l	40-140	40	40-140	40	40			
2-Fluorophenol	*367-12-4*									*21-120*		
Phenol-d6	*13127-88-3*									*10-120*		
Nitrobenzene-d5	*4165-60-0*									*23-120*		
2-Fluorobiphenyl	*321-60-8*									*15-120*		
2,4,6-Tribromophenol	*118-79-6*									*10-120*		
4-Terphenyl-d14	*1718-51-0*									*41-149*		

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TCL Pesticides - EPA 8081B (WATER)

Holding Time: 7 days
Container/Sample Preservation: 2 - Amber 120ml unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Delta-BHC	319-86-8	0.02	0.00467	ug/l	30-150	20	30-150	30	30			
Lindane	58-89-9	0.02	0.00434	ug/l	30-150	20	30-150	30	30			
Alpha-BHC	319-84-6	0.02	0.00439	ug/l	30-150	20	30-150	30	30			
Beta-BHC	319-85-7	0.02	0.0056	ug/l	30-150	20	30-150	30	30			
Heptachlor	76-44-8	0.02	0.0031	ug/l	30-150	20	30-150	30	30			
Aldrin	309-00-2	0.02	0.00216	ug/l	30-150	20	30-150	30	30			
Heptachlor epoxide	1024-57-3	0.02	0.00415	ug/l	30-150	20	30-150	30	30			
Endrin	72-20-8	0.04	0.00429	ug/l	30-150	20	30-150	30	30			
Endrin aldehyde	7421-93-4	0.04	0.0081	ug/l	30-150	20	30-150	30	30			
Endrin ketone	53494-70-5	0.04	0.00477	ug/l	30-150	20	30-150	30	30			
Dieldrin	60-57-1	0.04	0.00429	ug/l	30-150	20	30-150	30	30			
4,4'-DDE	72-55-9	0.04	0.00381	ug/l	30-150	20	30-150	30	30			
4,4'-DDD	72-54-8	0.04	0.00464	ug/l	30-150	20	30-150	30	30			
4,4'-DDT	50-29-3	0.04	0.00432	ug/l	30-150	20	30-150	30	30			
Endosulfan I	959-98-8	0.02	0.00345	ug/l	30-150	20	30-150	30	30			
Endosulfan II	33213-65-9	0.04	0.00519	ug/l	30-150	20	30-150	30	30			
Endosulfan sulfate	1031-07-8	0.04	0.00481	ug/l	30-150	20	30-150	30	30			
Methoxychlor	72-43-5	0.2	0.00684	ug/l	30-150	20	30-150	30	30			
Toxaphene	8001-35-2	0.2	0.0627	ug/l	30-150	20	30-150	30	30			
cis-Chlordane	5103-71-9	0.02	0.00666	ug/l	30-150	20	30-150	30	30			
trans-Chlordane	5103-74-2	0.02	0.00627	ug/l	30-150	20	30-150	30	30			
Chlordane	57-74-9	0.2	0.0463	ug/l	30-150	20	30-150	30	30			
2,4,5,6-Tetrachloro-m-xylene	*877-09-8*									*30-150*		
Decachlorobiphenyl	*2051-24-3*									*30-150*		

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Langan Engineering & Environmental

Herbicides -EPA 8151A (WATER)

Holding Time: 7 days
Container/Sample Preservation: 2 - Amber 1000ml unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
2,4-D	94-75-7	10	0.498	ug/l	30-150	25	30-150	25	25			
2,4,5-T	93-76-5	2	0.531	ug/l	30-150	25	30-150	25	25			
2,4,5-TP (Silvex)	93-72-1	2	0.539	ug/l	30-150	25	30-150	25	25			
DCAA	*19719-28-9*									*30-150*		

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Langan Engineering & Environmental

TCL PCBs - EPA 8082A (LVI) (WATER)

Holding Time: 365 days
Container/Sample Preservation: 2 - Amber 120ml unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Aroclor 1016	12674-11-2	0.0000714	0.000061047	mg/l	40-140	50	40-140	50	50			
Aroclor 1221	11104-28-2	0.0000714	0.000061047	mg/l	40-140	50	40-140	50	50			
Aroclor 1232	11141-16-5	0.0000714	0.000061047	mg/l	40-140	50	40-140	50	50			
Aroclor 1242	53469-21-9	0.0000714	0.000061047	mg/l	40-140	50	40-140	50	50			
Aroclor 1248	12672-29-6	0.0000714	0.000061047	mg/l	40-140	50	40-140	50	50			
Aroclor 1254	11097-69-1	0.0000714	0.000061047	mg/l	40-140	50	40-140	50	50			
Aroclor 1260	11096-82-5	0.0000714	0.000061047	mg/l	40-140	50	40-140	50	50			
Aroclor 1262	37324-23-5	0.0000714	0.000061047	mg/l	40-140	50	40-140	50	50			
Aroclor 1268	11100-14-4	0.0000714	0.000061047	mg/l	40-140	50	40-140	50	50			
PCBs, Total	1336-36-3	0.0000714	0.000061047	mg/l				50	50			
2,4,5,6-Tetrachloro-m-xylene	*877-09-8*									*30-150*		
Decachlorobiphenyl	*2051-24-3*									*30-150*		

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METALS by 6020B (WATER)

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria	Holding Time	Container
Aluminum, Total	7429-90-5	0.01	0.00327	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Antimony, Total	7440-36-0	0.004	0.000429	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Arsenic, Total	7440-38-2	0.0005	0.000165	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Barium, Total	7440-39-3	0.0005	0.000173	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Beryllium, Total	7440-41-7	0.0005	0.000107	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Cadmium, Total	7440-43-9	0.0002	0.0000599	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Calcium, Total	7440-70-2	0.1	0.0394	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Chromium, Total	7440-47-3	0.001	0.000178	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Cobalt, Total	7440-48-4	0.0005	0.000163	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Copper, Total	7440-50-8	0.001	0.000384	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Iron, Total	7439-89-6	0.05	0.0191	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Lead, Total	7439-92-1	0.001	0.000343	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Magnesium, Total	7439-95-4	0.07	0.0242	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Manganese, Total	7439-96-5	0.001	0.00044	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Nickel, Total	7440-02-0	0.002	0.000556	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Potassium, Total	7440-09-7	0.1	0.0309	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Selenium, Total	7782-49-2	0.005	0.00173	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Silver, Total	7440-22-4	0.0004	0.000163	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Sodium, Total	7440-23-5	0.1	0.0293	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Thallium, Total	7440-28-0	0.001	0.000143	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Vanadium, Total	7440-62-2	0.005	0.00157	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Zinc, Total	7440-66-6	0.01	0.00341	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved

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METALS by 7470A (WATER)

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria	Holding Time	Container
Mercury, Total	7439-97-6	0.0002	0.0000915	mg/l	80-120		75-125	20	20		28 days	1 - Plastic 500ml HNO3 preserved

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WETCHEM (WATER)

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Method	Holding Time	Container
Chromium, Hexavalent	18540-29-9	0.01	0.003	mg/l	85-115	20	85-115	20	20	7196A	24 hours	1 - Plastic 500ml unpreserved
Cyanide, Total	57-12-5	0.005	0.0018	mg/l	85-115	20	80-120	20	20	9010C/9012B	14 days	1 - Plastic 250ml NaOH preserved

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
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1,4 Dioxane via EPA 8270E-SIM (WATER)

Holding Time: 7 days
Container/Sample Preservation: 2 - Amber 250ml unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
1,4-Dioxane	123-91-1	150	33.9	ng/l	88-134	30	88-134	30	30			
1,4-Dioxane-d8	*17647-74-4*									*24-71*		
1,4-Dioxane-d8 (IS)	17647-74-4			ng/l								

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PFAAs via EPA 1633 (Draft) (WATER)

Holding Time: 28 days
Container/Sample Preservation: 3 - Plastic 500ml unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Perfluorobutanoic Acid (PFBA)	375-22-4	6.4	1.024	ng/l	40-150	30	40-150	30	30			
Perfluoropentanoic Acid (PFPeA)	2706-90-3	3.2	0.856	ng/l	40-150	30	40-150	30	30			
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	1.6	0.536	ng/l	40-150	30	40-150	30	30			
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	757124-72-4	6.4	1.672	ng/l	40-150	30	40-150	30	30			
Perfluorohexanoic Acid (PFHxA)	307-24-4	1.6	0.472	ng/l	40-150	30	40-150	30	30			
Perfluoropentanesulfonic Acid (PFPeS)	2706-91-4	1.6	0.28	ng/l	40-150	30	40-150	30	30			
Perfluoroheptanoic Acid (PFHpA)	375-85-9	1.6	0.32	ng/l	40-150	30	40-150	30	30			
Perfluorohexanesulfonic Acid (PFHxS)	355-46-4	1.6	0.384	ng/l	40-150	30	40-150	30	30			
Perfluorooctanoic Acid (PFOA)	335-67-1	1.6	0.696	ng/l	40-150	30	40-150	30	30			
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	27619-97-2	6.4	2.16	ng/l	40-150	30	40-150	30	30			
Perfluoroheptanesulfonic Acid (PFHpS)	375-92-8	1.6	0.432	ng/l	40-150	30	40-150	30	30			
Perfluorononanoic Acid (PFNA)	375-95-1	1.6	0.504	ng/l	40-150	30	40-150	30	30			
Perfluorooctanesulfonic Acid (PFOS)	1763-23-1	1.6	0.728	ng/l	40-150	30	40-150	30	30			
Perfluorodecanoic Acid (PFDA)	335-76-2	1.6	0.648	ng/l	40-150	30	40-150	30	30			
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	39108-34-4	6.4	2.488	ng/l	40-150	30	40-150	30	30			
Perfluorononanesulfonic Acid (PFNS)	68259-12-1	1.6	0.496	ng/l	40-150	30	40-150	30	30			
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA	2355-31-9	1.6	0.872	ng/l	40-150	30	40-150	30	30			
Perfluoroundecanoic Acid (PFUnA)	2058-94-8	1.6	0.696	ng/l	40-150	30	40-150	30	30			
Perfluorodecanesulfonic Acid (PFDS)	335-77-3	1.6	0.368	ng/l	40-150	30	40-150	30	30			
Perfluorooctanesulfonamide (FOSA)	754-91-6	1.6	0.432	ng/l	40-150	30	40-150	30	30			
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	2991-50-6	1.6	0.864	ng/l	40-150	30	40-150	30	30			
Perfluorododecanoic Acid (PFDoA)	307-55-1	1.6	0.736	ng/l	40-150	30	40-150	30	30			
Perfluorotridecanoic Acid (PFTrDA)	72629-94-8	1.6	0.6	ng/l	40-150	30	40-150	30	30			
Perfluorotetradecanoic Acid (PFTA)	376-06-7	1.6	0.424	ng/l	40-150	30	40-150	30	30			
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Pro	13252-13-6	6.4	0.896	ng/l	40-150	30	40-150	30	30			
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	919005-14-4	6.4	1.008	ng/l	40-150	30	40-150	30	30			
Perfluorododecane Sulfonic Acid (PFDoDS)	79780-39-5	1.6	0.608	ng/l	40-150	30	40-150	30	30			
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3	756426-58-1	6.4	1.32	ng/l	40-150	30	40-150	30	30			
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-	763051-92-9	6.4	1.32	ng/l	40-150	30	40-150	30	30			
N-Methyl Perfluorooctane Sulfonamide (NMeFOSA)	31506-32-8	1.6	0.696	ng/l	40-150	30	40-150	30	30			
N-Ethyl Perfluorooctane Sulfonamide (NEtFOSA)	4151-50-2	1.6	0.736	ng/l	40-150	30	40-150	30	30			
N-Methyl Perfluorooctanesulfonamido Ethanol (NMeFOSE)	24448-09-7	16	3.76	ng/l	40-150	30	40-150	30	30			
N-Ethyl Perfluorooctanesulfonamido Ethanol (NEtFOSE)	1691-99-2	16	1.96	ng/l	40-150	30	40-150	30	30			
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	377-73-1	3.2	0.456	ng/l	40-150	30	40-150	30	30			
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	863090-89-5	3.2	0.424	ng/l	40-150	30	40-150	30	30			
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEESA)	113507-82-7	3.2	0.352	ng/l	40-150	30	40-150	30	30			
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	151772-58-6	3.2	1.888	ng/l	40-150	30	40-150	30	30			
3-Perfluoropropyl Propanoic Acid (3:3FTCA)	356-02-5	8	2.64	ng/l	40-150	30	40-150	30	30			
2H,2H,3H,3H-Perfluorooctanoic Acid (5:3FTCA)	914637-49-3	40	9.36	ng/l	40-150	30	40-150	30	30			
3-Perfluoroheptyl Propanoic Acid (7:3FTCA)	812-70-4	40	6.312	ng/l	40-150	30	40-150	30	30			
Perfluoro[13C4]Butanoic Acid (MPFBA)	*NONE*									*20-150*		
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	*NONE*									*20-150*		

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PFAAs via EPA 1633 (Draft) (WATER)

Holding Time: 28 days
Container/Sample Preservation: 3 - Plastic 500ml unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	*NONE*									*20-150*		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4	*NONE*									*20-150*		
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	*NONE*									*20-150*		
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	*NONE*									*20-150*		
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	*NONE*									*20-150*		
Perfluoro[13C8]Octanoic Acid (M8PFOA)	*NONE*									*20-150*		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6	*NONE*									*20-150*		
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	*NONE*									*20-150*		
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	*NONE*									*20-150*		
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	*NONE*									*20-150*		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8	*NONE*									*20-150*		
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (	*NONE*									*20-150*		
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	*NONE*									*20-150*		
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	*NONE*									*20-150*		
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d	*NONE*									*20-150*		
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	*NONE*									*20-150*		
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	*NONE*									*20-150*		
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13	*NONE*									*20-150*		
N-Methyl-d3-Perfluoro-1-Octanesulfonamide (d3-NMeFOSA)	*NONE*									*20-150*		
N-Ethyl-d5-Perfluoro-1-Octanesulfonamide (d5-NEtFOSA)	*NONE*									*20-150*		
2-(N-Methyl-d3-Perfluoro-1-Octanesulfonamido)ethan-d4-ol	*1265205-95-5*									*20-150*		
2-(N-Ethyl-d5-Perfluoro-1-Octanesulfonamido)ethan-d4-ol (d	*NONE*									*20-150*		

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TPH by GC-FID Quantitation Only (WATER)

Holding Time: 7 days
Container/Sample Preservation: 2 - Amber 500ml unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
TPH (C10-C36)	NONE	200	84	ug/l	40-140	40	40-140	40	40			
o-Terphenyl	*84-15-1*									*40-140*		

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TPH - Gasoline Range Organics (WATER)

Holding Time: 14 days
Container/Sample Preservation: 3 - Vial HCl preserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Gasoline Range Organics	NONE	50	5.8	ug/l	80-120	20	80-120	20	20			
1,1,1-Trifluorotoluene	*98-08-8*									*70-130*		
4-Bromofluorobenzene	*460-00-4*									*70-130*		

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Attachment B
Air Samples
Laboratory Reporting Limits and Method Detection Limits

Method	Analyte	Reporting Limit	Units		Method	Analyte	Reporting Limit	Units
TO15	1,1,2,2-Tetrachloroethane	1.37	ug/m3		TO15	1,1,2,2-Tetrachloroethane	0.2	ppbV
TO15	1,1,2-Trichloroethane	1.09	ug/m3		TO15	1,1,2-Trichloroethane	0.2	ppbV
TO15	1,1-Dichloroethane	0.809	ug/m3		TO15	1,1-Dichloroethane	0.2	ppbV
TO15	1,2,4-Trichlorobenzene	1.48	ug/m3		TO15	1,2,4-Trichlorobenzene	0.2	ppbV
TO15	1,2,4-Trimethylbenzene	0.983	ug/m3		TO15	1,2,4-Trimethylbenzene	0.2	ppbV
TO15	1,2-Dibromoethane	1.54	ug/m3		TO15	1,2-Dibromoethane	0.2	ppbV
TO15	1,2-Dichlorobenzene	1.2	ug/m3		TO15	1,2-Dichlorobenzene	0.2	ppbV
TO15	1,2-Dichloroethane	0.809	ug/m3		TO15	1,2-Dichloroethane	0.2	ppbV
TO15	1,2-Dichloropropane	0.924	ug/m3		TO15	1,2-Dichloropropane	0.2	ppbV
TO15	1,3,5-Trimethylbenzene	0.983	ug/m3		TO15	1,3,5-Trimethylbenzene	0.2	ppbV
TO15	1,3-Butadiene	0.442	ug/m3		TO15	1,3-Butadiene	0.2	ppbV
TO15	1,3-Dichlorobenzene	1.2	ug/m3		TO15	1,3-Dichlorobenzene	0.2	ppbV
TO15	1,4-Dichlorobenzene	1.2	ug/m3		TO15	1,4-Dichlorobenzene	0.2	ppbV
TO15	1,4-Dioxane	0.721	ug/m3		TO15	1,4-Dioxane	0.2	ppbV
TO15	2,2,4-Trimethylpentane	0.934	ug/m3		TO15	2,2,4-Trimethylpentane	0.2	ppbV
TO15	2-Butanone	1.47	ug/m3		TO15	2-Butanone	0.5	ppbV
TO15	2-Hexanone	0.82	ug/m3		TO15	2-Hexanone	0.2	ppbV
TO15	3-Chloropropene	0.626	ug/m3		TO15	3-Chloropropene	0.2	ppbV
TO15	4-Ethyltoluene	0.983	ug/m3		TO15	4-Ethyltoluene	0.2	ppbV
TO15	4-Methyl-2-pentanone	2.05	ug/m3		TO15	4-Methyl-2-pentanone	0.5	ppbV
TO15	Acetone	2.38	ug/m3		TO15	Acetone	1	ppbV
TO15	Benzene	0.639	ug/m3		TO15	Benzene	0.2	ppbV
TO15	Benzyl chloride	1.04	ug/m3		TO15	Benzyl chloride	0.2	ppbV
TO15	Bromodichloromethane	1.34	ug/m3		TO15	Bromodichloromethane	0.2	ppbV
TO15	Bromoform	2.07	ug/m3		TO15	Bromoform	0.2	ppbV
TO15	Bromomethane	0.777	ug/m3		TO15	Bromomethane	0.2	ppbV
TO15	Carbon disulfide	0.623	ug/m3		TO15	Carbon disulfide	0.2	ppbV
TO15	Chlorobenzene	0.921	ug/m3		TO15	Chlorobenzene	0.2	ppbV
TO15	Chloroethane	0.528	ug/m3		TO15	Chloroethane	0.2	ppbV
TO15	Chloroform	0.977	ug/m3		TO15	Chloroform	0.2	ppbV
TO15	Chloromethane	0.413	ug/m3		TO15	Chloromethane	0.2	ppbV
TO15	cis-1,3-Dichloropropene	0.908	ug/m3		TO15	cis-1,3-Dichloropropene	0.2	ppbV
TO15	Cyclohexane	0.688	ug/m3		TO15	Cyclohexane	0.2	ppbV
TO15	Dibromochloromethane	1.7	ug/m3		TO15	Dibromochloromethane	0.2	ppbV
TO15	Dichlorodifluoromethane	0.989	ug/m3		TO15	Dichlorodifluoromethane	0.2	ppbV
TO15	Ethanol	9.42	ug/m3		TO15	Ethanol	5	ppbV
TO15	Ethyl Acetate	1.8	ug/m3		TO15	Ethyl Acetate	0.5	ppbV
TO15	Ethylbenzene	0.869	ug/m3		TO15	Ethylbenzene	0.2	ppbV
TO15	Freon-113	1.53	ug/m3		TO15	Freon-113	0.2	ppbV
TO15	Freon-114	1.4	ug/m3		TO15	Freon-114	0.2	ppbV
TO15	Heptane	0.82	ug/m3		TO15	Heptane	0.2	ppbV
TO15	Hexachlorobutadiene	2.13	ug/m3		TO15	Hexachlorobutadiene	0.2	ppbV
TO15	Isopropanol	1.23	ug/m3		TO15	Isopropanol	0.5	ppbV
TO15	Methyl tert butyl ether	0.721	ug/m3		TO15	Methyl tert butyl ether	0.2	ppbV
TO15	Methylene chloride	1.74	ug/m3		TO15	Methylene chloride	0.5	ppbV
TO15	n-Hexane	0.705	ug/m3		TO15	n-Hexane	0.2	ppbV
TO15	o-Xylene	0.869	ug/m3		TO15	o-Xylene	0.2	ppbV
TO15	p/m-Xylene	1.74	ug/m3		TO15	p/m-Xylene	0.4	ppbV
TO15	Styrene	0.852	ug/m3		TO15	Styrene	0.2	ppbV
TO15	Tertiary butyl Alcohol	1.52	ug/m3		TO15	Tertiary butyl Alcohol	0.5	ppbV
TO15	Tetrahydrofuran	1.47	ug/m3		TO15	Tetrahydrofuran	0.5	ppbV
TO15	Toluene	0.754	ug/m3		TO15	Toluene	0.2	ppbV
TO15	trans-1,2-Dichloroethene	0.793	ug/m3		TO15	trans-1,2-Dichloroethene	0.2	ppbV
TO15	trans-1,3-Dichloropropene	0.908	ug/m3		TO15	trans-1,3-Dichloropropene	0.2	ppbV
TO15	Trichlorofluoromethane	1.12	ug/m3		TO15	Trichlorofluoromethane	0.2	ppbV
TO15	Vinyl bromide	0.874	ug/m3		TO15	Vinyl bromide	0.2	ppbV
TO15-SIM	1,1,1-Trichloroethane	0.109	ug/m3		TO15-SIM	1,1,1-Trichloroethane	0.02	ppbV
TO15-SIM	1,1-Dichloroethene	0.079	ug/m3		TO15-SIM	1,1-Dichloroethene	0.02	ppbV
TO15-SIM	Carbon tetrachloride	0.126	ug/m3		TO15-SIM	Carbon tetrachloride	0.02	ppbV
TO15-SIM	cis-1,2-Dichloroethene	0.079	ug/m3		TO15-SIM	cis-1,2-Dichloroethene	0.02	ppbV
TO15-SIM	Tetrachloroethene	0.136	ug/m3		TO15-SIM	Tetrachloroethene	0.02	ppbV
TO15-SIM	Trichloroethene	0.107	ug/m3		TO15-SIM	Trichloroethene	0.02	ppbV
TO15-SIM	Vinyl chloride	0.051	ug/m3		TO15-SIM	Vinyl chloride	0.02	ppbV

Attachment B
Soil Vapor Samples
Laboratory Reporting Limits and Method Detection Limits

Method	Analyte	Reporting Limit	Units	Method	Analyte	Reporting Limit	Units
TO15	1,1,1-Trichloroethane	1.09	ug/m3	TO15	1,1,1-Trichloroethane	0.2	ppbV
TO15	1,1,2,2-Tetrachloroethane	1.37	ug/m3	TO15	1,1,2,2-Tetrachloroethane	0.2	ppbV
TO15	1,1,2-Trichloroethane	1.09	ug/m3	TO15	1,1,2-Trichloroethane	0.2	ppbV
TO15	1,1-Dichloroethane	0.809	ug/m3	TO15	1,1-Dichloroethane	0.2	ppbV
TO15	1,1-Dichloroethene	0.793	ug/m3	TO15	1,1-Dichloroethene	0.2	ppbV
TO15	1,2,4-Trichlorobenzene	1.48	ug/m3	TO15	1,2,4-Trichlorobenzene	0.2	ppbV
TO15	**1,2,4-Trimethylbenzene**	**0.983**	**ug/m3**	**TO15**	**1,2,4-Trimethylbenzene**	**0.2**	**ppbV**
TO15	1,2-Dibromoethane	1.54	ug/m3	TO15	1,2-Dibromoethane	0.2	ppbV
TO15	1,2-Dichlorobenzene	1.2	ug/m3	TO15	1,2-Dichlorobenzene	0.2	ppbV
TO15	1,2-Dichloroethane	0.809	ug/m3	TO15	1,2-Dichloroethane	0.2	ppbV
TO15	1,2-Dichloropropane	0.924	ug/m3	TO15	1,2-Dichloropropane	0.2	ppbV
TO15	**1,3,5-Trimethylbenzene**	**0.983**	**ug/m3**	**TO15**	**1,3,5-Trimethylbenzene**	**0.2**	**ppbV**
TO15	1,3-Butadiene	0.442	ug/m3	TO15	1,3-Butadiene	0.2	ppbV
TO15	1,3-Dichlorobenzene	1.2	ug/m3	TO15	1,3-Dichlorobenzene	0.2	ppbV
TO15	1,4-Dichlorobenzene	1.2	ug/m3	TO15	1,4-Dichlorobenzene	0.2	ppbV
TO15	1,4-Dioxane	0.721	ug/m3	TO15	1,4-Dioxane	0.2	ppbV
TO15	**2,2,4-Trimethylpentane**	**0.934**	**ug/m3**	**TO15**	**2,2,4-Trimethylpentane**	**0.2**	**ppbV**
TO15	2-Butanone	1.47	ug/m3	TO15	2-Butanone	0.5	ppbV
TO15	2-Hexanone	0.82	ug/m3	TO15	2-Hexanone	0.2	ppbV
TO15	3-Chloropropene	0.626	ug/m3	TO15	3-Chloropropene	0.2	ppbV
TO15	4-Ethyltoluene	0.983	ug/m3	TO15	4-Ethyltoluene	0.2	ppbV
TO15	4-Methyl-2-pentanone	2.05	ug/m3	TO15	4-Methyl-2-pentanone	0.5	ppbV
TO15	Acetone	2.38	ug/m3	TO15	Acetone	1	ppbV
TO15	**Benzene**	**0.639**	**ug/m3**	**TO15**	**Benzene**	**0.2**	**ppbV**
TO15	Benzyl chloride	1.04	ug/m3	TO15	Benzyl chloride	0.2	ppbV
TO15	Bromodichloromethane	1.34	ug/m3	TO15	Bromodichloromethane	0.2	ppbV
TO15	Bromoform	2.07	ug/m3	TO15	Bromoform	0.2	ppbV
TO15	Bromomethane	0.777	ug/m3	TO15	Bromomethane	0.2	ppbV
TO15	Carbon disulfide	0.623	ug/m3	TO15	Carbon disulfide	0.2	ppbV
TO15	Carbon tetrachloride	1.26	ug/m3	TO15	Carbon tetrachloride	0.2	ppbV
TO15	Chlorobenzene	0.921	ug/m3	TO15	Chlorobenzene	0.2	ppbV
TO15	Chloroethane	0.528	ug/m3	TO15	Chloroethane	0.2	ppbV
TO15	Chloroform	0.977	ug/m3	TO15	Chloroform	0.2	ppbV
TO15	Chloromethane	0.413	ug/m3	TO15	Chloromethane	0.2	ppbV
TO15	cis-1,2-Dichloroethene	0.793	ug/m3	TO15	cis-1,2-Dichloroethene	0.2	ppbV
TO15	cis-1,3-Dichloropropene	0.908	ug/m3	TO15	cis-1,3-Dichloropropene	0.2	ppbV
TO15	**Cyclohexane**	**0.688**	**ug/m3**	**TO15**	**Cyclohexane**	**0.2**	**ppbV**
TO15	Dibromochloromethane	1.7	ug/m3	TO15	Dibromochloromethane	0.2	ppbV
TO15	Dichlorodifluoromethane	0.989	ug/m3	TO15	Dichlorodifluoromethane	0.2	ppbV
TO15	Ethanol	9.42	ug/m3	TO15	Ethanol	5	ppbV
TO15	Ethyl Acetate	1.8	ug/m3	TO15	Ethyl Acetate	0.5	ppbV
TO15	**Ethylbenzene**	**0.869**	**ug/m3**	**TO15**	**Ethylbenzene**	**0.2**	**ppbV**
TO15	Freon-113	1.53	ug/m3	TO15	Freon-113	0.2	ppbV
TO15	Freon-114	1.4	ug/m3	TO15	Freon-114	0.2	ppbV
TO15	**Heptane**	**0.82**	**ug/m3**	**TO15**	**Heptane**	**0.2**	**ppbV**
TO15	Hexachlorobutadiene	2.13	ug/m3	TO15	Hexachlorobutadiene	0.2	ppbV
TO15	Isopropanol	1.23	ug/m3	TO15	Isopropanol	0.5	ppbV
TO15	Methyl tert butyl ether	0.721	ug/m3	TO15	Methyl tert butyl ether	0.2	ppbV
TO15	Methylene chloride	1.74	ug/m3	TO15	Methylene chloride	0.5	ppbV
TO15	**n-Hexane**	**0.705**	**ug/m3**	**TO15**	**n-Hexane**	**0.2**	**ppbV**
TO15	**o-Xylene**	**0.869**	**ug/m3**	**TO15**	**o-Xylene**	**0.2**	**ppbV**
TO15	**p/m-Xylene**	**1.74**	**ug/m3**	**TO15**	**p/m-Xylene**	**0.4**	**ppbV**
TO15	Styrene	0.852	ug/m3	TO15	Styrene	0.2	ppbV
TO15	Tertiary butyl Alcohol	1.52	ug/m3	TO15	Tertiary butyl Alcohol	0.5	ppbV
TO15	Tetrachloroethene	1.36	ug/m3	TO15	Tetrachloroethene	0.2	ppbV
TO15	Tetrahydrofuran	1.47	ug/m3	TO15	Tetrahydrofuran	0.5	ppbV
TO15	**Toluene**	**0.754**	**ug/m3**	**TO15**	**Toluene**	**0.2**	**ppbV**
TO15	trans-1,2-Dichloroethene	0.793	ug/m3	TO15	trans-1,2-Dichloroethene	0.2	ppbV
TO15	trans-1,3-Dichloropropene	0.908	ug/m3	TO15	trans-1,3-Dichloropropene	0.2	ppbV
TO15	Trichloroethene	1.07	ug/m3	TO15	Trichloroethene	0.2	ppbV
TO15	Trichlorofluoromethane	1.12	ug/m3	TO15	Trichlorofluoromethane	0.2	ppbV
TO15	Vinyl bromide	0.874	ug/m3	TO15	Vinyl bromide	0.2	ppbV
TO15	Vinyl chloride	0.511	ug/m3	TO15	Vinyl chloride	0.2	ppbV
TO15-LL	**Naphthalene**	**1.05**	**ug/m3**	**TO15**	**Naphthalene**	**0.2**	**ppbV**

ATTACHMENT D

ANALYTICAL METHODS/QUALITY ASSURANCE SUMMARY TABLE

ATTACHMENT D

ANALYTICAL METHODS/QUALITY ASSURANCE SUMMARY TABLE

Matrix Type	Field Parameters	Laboratory Parameters	Analytical Methods	Sample Preservation	Sample Container Volume and Type	Sample Hold Time	Field Duplicate Samples	Equipment Blank Samples	Trip Blank Samples	Ambient Air Samples	MS/MSD Samples
Groundwater	Temperature, Turbidity, pH, ORP, Conductivity	Part 375 + TCL VOCs	EPA 8260C	Cool to 4°C; HCl to pH <2;no headspace	Three 40-mL VOC vials with Teflon®-lined cap	Analyze within 14 days of collection	1 per 20 samples (minimum 1)	1 per 20 samples (minimum 1)	1 per shipment of VOC samples	NA	1 per 20 samples
		1,4-dioxane	8270D SIM isotope dilution	Cool to 4°C	One 1-Liter Amber Glass	7 days to extract, 40 days after extraction to analysis					
		Part 375 + TCL SVOCs	EPA 8270D	Cool to 4°C	Two 1-Liter Amber Glass	7 days to extract, 40 days after extraction to analysis					
		Part 375 + TAL Metals	EPA 6020B, EPA 7470A	Cool to 4°C; HNO_3	250 ml plastic	6 months, except Mercury 28 days					
		Hexavalent Chromium	EPA 7196A	Cool to 4°C	250 ml plastic	24 hours					
		Cyanide	EPA 9010C/9012B	Cool to 4°C; NaOH plus 0.6g ascorbic acid	250 ml plastic	14 days					
		Part 375 + TCL Herbicides	EPA 8151A	Cool to 4°C	Two 1-Liter Amber Glass	7 days to extract, 40 days after extraction to analysis					
		Part 375 + TCL Pesticides	EPA 8081B	Cool to 4°C	Two 1-Liter Amber Glass for Pesticides/PCB	7 days to extract, 40 days after extraction to analysis					
		PCBs	EPA 8082A	Cool to 4°C		7 days to extract, 40 days after extraction to analysis					
		Per- and polyfluoroalykl substances (PFAS)	EPA 1633	Cool to 4°C, Trizma	Two 250 mL high density polyethylene (HDPE) bottles	14 days	1 per 20 samples (minimum 1)	1 per 20 samples (minimum 1)	N/A	N/A	1 per 20 samples (minimum 1)

ATTACHMENT D

ANALYTICAL METHODS/QUALITY ASSURANCE SUMMARY TABLE

Matrix Type	Field Parameters	Laboratory Parameters	Analytical Methods	Sample Preservation	Sample Container Volume and Type	Sample Hold Time	Field Duplicate Samples	Equipment Blank Samples	Trip Blank Samples	Ambient Air Samples	MS/MSD Samples
Soil	Total VOCs via PID	Part 375 + TCL VOCs	EPA 8260C	Cool to 4°C	Two 40-ml VOC vials with 5ml H_2O, one with MeOH (separate container for % solids)	48 hours after sampling if samples are not frozen to -7° C, 14 days after extraction to analysis	1 per 20 samples (minimum 1)	1 per 20 samples (minimum 1)	1 per shipment of VOC samples	NA	1 per 20 samples
		Part 375 + TCL SVOCs	EPA 8270D	Cool to 4°C	4 oz. amber glass jar	14 days extract, 40 days after extraction to analysis					
		Part 375 + TAL Metals	EPA 6010D, EPA 7471B, EPA 7196A, EPA 9010C/9012B	Cool to 4°C	2 oz. amber glass jar	6 months, except mercury 28 days					
		Part 375 + TCL Pesticides	EPA 8081B	Cool to 4°C	4 oz. amber glass jar	14 days extract, 40 days after extraction to analysis					
		Part 375 + TCL Herbicides	EPA 8151A	Cool to 4°C	4 oz. amber glass jar	14 days extract, 40 days after extraction to analysis					
		Part 375 + TCL PCBs	EPA 8082A	Cool to 4°C	4 oz. amber glass jar	14 days extract, 40 days after extraction to analysis					
		PFAS	LC/MS/MS method based on Method 1633	Cool to 4°C	8 oz. plastic	14 days extract, 28 days after extraction to analysis	1 per 20 samples or 1 per day (whichever is more frequent)				
Product	N/A	Petrleum Hydrocarbon Identification (PHI)	EPA 8015D(M)	Cool to 4°C	4 oz. amber glass jar	14 days extract, 40 days after extraction to analysis	N/A	N/A	N/A	N/A	N/A
		Density	ASTM D1475	Cool to 4°C	4 oz. amber glass jar	N/A	N/A	N/A	N/A	N/A	N/A
		Viscosity	ASTM D445	Cool to 4°C	4 oz. amber glass jar	N/A	N/A	N/A	N/A	N/A	N/A
Soil Vapor	Total VOCs and Methane with MultiGas Meter	TO-15 Listed VOCs	TO-15	Ambient Temperature	6-Liter Summa Canister	Analyze within 30 days of collection	1 per 20 samples (minimum 1)	NA	NA	1 per 10 samples (minimum 1)	NA
Ambient Air	Total VOCs via PID	TO-15 Listed VOCs	TO-15	Ambient Temperature	6-Liter Summa Canister	Analyze within 30 days of collection	1 per 20 samples (minimum 1)	NA	NA	1 per 10 samples (minimum 1)	NA

Notes:
1. PID - Photoionization Detector
2. VOC - Volatile organic compound
3. EPA - Environmental Protection Agency
4. TCL - Target compound list
5. TAL - Target analyte list

ATTACHMENT E

SAMPLE NOMENCLATURE

SOP #01 – Sample Nomenclature

INTRODUCTION

The Langan Environmental Group conducts an assortment of site investigations where samples (Vapor, Solids, and Aqueous) are collected and submitted to analytical laboratories for analysis. The results of which are then evaluated and entered into a data base allowing quick submittal to the state regulatory authority (New York State Division of Environmental Conservation [NYSDEC]). In addition, Langan is linking their data management system to graphic and analytical software to enable efficient evaluation of the data as well as creating client-ready presentational material.

SCOPE AND APPLICATION

This Standard Operating Procedure (SOP) is applicable to the general framework for labeling vapor, solid (soil) and aqueous (groundwater) samples that will be submitted for laboratory analysis. The nomenclature being introduced is designed to meet the NYSDEC EQuIS standard and has been incorporated into Langan software scripts to assist project personnel in processing the data. While this SOP is applicable to all site investigation; unanticipated conditions may arise which may require considerable flexibility in complying with this SOP. Therefore, guidance provided in this SOP is presented in terms of general steps and strategies that should be applied; but deviation from this SOP must be reported to the Project Manager (PM) immediately.

GENERAL SAMPLE IDENTIFICATION CONSIDERATIONS

Sample Labels

All sample ware must have a label. Recall that when you are using the Encore™ samples (see below); they are delivered in plastic lined foil bags. You are to label the bags[1]:

All other samples containers including Terra Cores™ must be labeled with laboratory provided self-adhesive labels.

Quick Breakdown of Sample Format

The general format for sample nomenclature is:

[1]Both Alpha and York laboratories permit the combining of the three Encore™ into a single bag. This may not be appropriate for all laboratories so please confirm with the labs themselves

LLNN_ID

Where

LL is a grouping of two (2) to four (4) letters signifying the sample media source. In older nomenclature SOPs this portion of the sample identification is commonly referred to as the *Sample Investigation Code*

NN represents a two digit number identifying the specific sample location or sample sequence number

_ ***(underscore)*** is required between the sample lettering and numeric identification and additional modifying data that determines the date of sampling or the depth of the sample interval

ID is a modifier specific to the sample type media (depth of soil sample or date of groundwater sample)

LL – Sample Investigation Code

Langan has devised a list of two to four letters to insure a quick ability to identify the sample investigation.

Code	Investigation
AA	Ambient Air
DS	Drum
EPB	Endpoint Location - Bottom (Excavation)
EPSW	Endpoint Location - Sidewall (Excavation)
FP	Free Product
IA	Indoor Air
IDW	Investigation Derived Waste (Soil Pile)
MW	Monitoring Well (Permanent)
SB	Soil Boring
SG	Staff Gauge (Stream Gauging)
SL	Sludge
SV	Soil Vapor Point
SVE	Soil Vapor Extraction Well
SW	Surface Water
TMW	Temporary Monitoring Well
TP	Test Pit (Excavated Material from Test Pit Not Associated With Sidewall or Bottom Samples)
WC	Waste Characterization Boring
COMP	Composite Sample
TB	Trip Blank (QA/QC Sampling – All Investigations)
FB	Field Blank (QA/QC Sampling – All Investigations)
DUP	Duplicate (QA/QC Sampling – All Investigations)

NN – Numeric Identifier

The two digit number that follows the sample investigation code (LL) identifies the specific sample based on the soil boring, monitoring well, endpoint or other location identification. For a subset of samples

where there is no specific location identifier, the two digit number is the sequence number for the sample submitted. For example, an aqueous sample from a monitoring well identified as MW-1 would have the sample investigation code of MW and the numeric identifier as 01. Note there is no hyphen. The same can be done for soil borings, a soil sample collected from soil boring 9 (SB-9) would be have the LLNN identification of SB09 (again, no hyphen).

Note however that there is a subset of samples related to laboratory analytical quality assurance, among these includes TB, FB, and DUP. On many investigations, the Scope will require multiple collections of these types of samples, therefore the numerical number represents the sequence sample count where the first sample is 01, the second sample is 02, and the third sample is 03 and so on.

_ Underscore
The underscore is required. It separates the investigation code and numeric identifier from the modifier specific to the sample itself. Note that every effort should be made to insure that the underscore is clear on the sample label and chain of custody (COC).

ID – Modifier Specific to Type Media
Each sample investigation code and numeric identifier is further modified by an ID specific to the sample type media. In general, soil samples (soil borings or endpoint samples) use an ID that indicates the depth at which the sample was taken. Aqueous samples (groundwater or surface water samples) are identified by the date the sample was collected. Other types of samples including quality control (TB, FB, and DUP), Vapor samples (AA, IA, SV or SVE), other soil type samples (IDW, sludge, free product, drum, and others) are also identified by a date. The following rules apply to the ID when using sample depth or sample date.

Sample Depth
The sample depth must be whole numbers (no fractions) separated by a hyphen. Thus for a soil sample collected from the soil boring SB-1 from a depth of 6 feet to 8 feet, the sample would be identified as:

SB01_6-8

Unfortunately, the NYSDEC EQuIS system does not accept fractions. Therefore, if your sample interval is a fraction of a foot (6.5-7.5), round up to the larger interval (6-8).

Sample Date
The sample date is always in the format of MMDDYY. Note that the year is two digits. Thus for a groundwater sample collected on July 1, 2015 from the monitoring well MW-1, the sample would be identified as:

MW01_070115

Special Cases
There are a couple of specific sample types that require further explanation.

Endpoint Sampling
End point sidewall samples are sometimes modified by magnetic direction (N, S, E, and W). For example, the first sidewall endpoint sample from the north wall of an excavation at a depth of 5 feet would be written as:

EPSW01_N_5

Again, note that the N in the identification refers to north and is separated from the prefix investigation code/numeric identifier and ID modifier suffix by underscores.

Vapor Extraction Well Sample
As with the sidewall endpoint samples, the sample name is altered by inserting a middle modifier between the prefix and suffix of the sample name. The middle modifier is used to identify the source of the sample (inlet sample port, midpoint sample port or outlet sample port). For example the midpoint port of the vapor extraction well number 1 sampled on July 1, 2015 would be written as;

SVE01_MID_070115

Matrix Spike and Matrix Spike Duplicate
On occasion, a Langan investigation will collect a sample to be used to provide the lab with a site specific medium to spike to determine the quality of the analytical method. This special case of sampling requires additional information to be used in the sample name, specifically, a suffix specifying whether the sample is the matrix spike (MS) or the matrix spike duplicate (MSD). In the following example, the sample is collected from soil boring number 1 at a depth of 2-4 feet. For the matrix spike sample:

SB01_2-4_MS

and for the matrix spike duplicate sample:

SB01_2-4_MSD

Multiple Interval Groundwater Sampling
Although not currently a common practice, low flow sampling facilitates stratigraphic sampling of a monitoring well. If the scope requires stratigraphic sampling then groundwater samples will be labeled with a lower case letter following the well number. For example, placing the pump or sampling tube at 10 feet below surface in MW01 on July 1, 2015 would require the sample to be labeled as:

MW01a_070115

While a second sample where the pump or tubing intake is placed at 20 feet would be labeled as:

MW01b_070115

Note that it is important that you record what depth the intake for each sample represents in your field notes; as this information is going to be critical to interpreting the results.

ATTACHMENT F

SAMPLING AND ANALYSIS PROTOCOLS

Method 1633 Analysis of Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous, Solid, Biosolids and Tissue Samples by LC-MS/MS

References: Method 1633 - Analysis of Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous, Solid, Biosolids, and Tissue Samples by LC-MS/MS (2nd Draft - June 2022)

DOD QSM (US Department of Defense Quality Systems Manual for Environmental Laboratories, version 5.4, 20221)

1. Scope and Application

Matrices: Drinking water, Non-potable Water, Tissues, Biosolids and Soil Matrices

Definitions: Refer to Alpha Analytical Quality Manual.

1.1 Method 1633 is for use in the Clean Water Act (CWA) for the determination of the per- and polyfluoroalkyl substances (PFAS) in Table 1 in aqueous, solid (soil, biosolids, sediment) and tissue samples by liquid chromatography/mass spectrometry (LC-MS/MS).

1.2 The method calibrates and quantifies PFAS analytes using isotopically labeled standards. Where linear and branched isomers are present in the sample and either qualitative or quantitative standards containing branched and linear isomers are commercially available, the PFAS analyte is reported as a single analyte consisting of the sum of the linear and branched isomer concentrations

1.3 This is a liquid chromatography/tandem mass spectrometry (LC/MS/MS) method for the determination of selected perfluorinated alkyl substances (PFAS) in Non-Drinking Water, tissue soil and biosolid Matrices. Accuracy and precision data have been generated for the compounds listed in Table 1.

1.4 The data report packages present the documentation of any method modification related to the samples tested. Depending upon the nature of the modification and the extent of intended use, the laboratory may be required to demonstrate that the modifications will produce equivalent results for the matrix. Approval of all method modifications is by one or more of the following laboratory personnel before performing the modification: Area Supervisor, Department Supervisor, Laboratory Director, or Quality Assurance Officer.

1.5 This method is restricted to use by or under the supervision of analysts experienced in the operation of the LC/MS/MS and in the interpretation of LC/MS/MS data. Each analyst must demonstrate the ability to generate acceptable results with this method by performing an initial demonstration of capability.

2. Summary of Method

2.1 Environmental samples are prepared and extracted using method-specific procedures. Sample extracts are subjected to cleanup procedures designed to remove interferences. Analyses of the sample extracts are conducted by LC-MS/MS in the multiple reaction monitoring (MRM) mode. Sample concentrations are determined by isotope dilution or extracted internal standard quantification using isotopically labeled compounds added to the samples before extraction.

2.2 Aqueous samples are spiked with isotopically labeled standards, extracted using solid-phase extraction (SPE) cartridges and undergo cleanup using carbon before analysis.

2.3 Solid samples are spiked with isotopically labeled standards, extracted into basic methanol, and cleaned up by carbon and SPE cartridges before analysis

2.4 Tissue samples are spiked with isotopically labeled standards, extracted in potassium hydroxide and acetonitrile followed by basic methanol, and cleaned up by carbon and SPE cartridges before analysis.

2.5 A sample extract is injected into an LC equipped with a C18 column that is interfaced to an MS/MS). The analytes are separated and identified by comparing the acquired mass spectra and retention times to reference spectra and retention times for calibration standards acquired under identical LC/MS/MS conditions. The concentration of each analyte is determined by using the isotope dilution technique. Extracted Internal Standards (EIS) analytes are used to monitor the extraction efficiency of the method analytes.

2.6 Method Modifications from Reference

N/A

3. Reporting Limits

The reporting limit for PFAS's are listed in Table 8.

4. Interferences

4.1 PFAS standards, extracts and samples should not come in contact with any glass containers or pipettes as these analytes can potentially adsorb to glass surfaces. PFAS analyte and EIS standards commercially purchased in glass ampoules are acceptable; however, all subsequent transfers or dilutions performed by the analyst must be prepared and stored in polypropylene containers.

4.2 Method interferences may be caused by contaminants in solvents, reagents (including reagent water), sample bottles and caps, and other sample processing hardware that lead to discrete artifacts and/or elevated baselines in the chromatograms. The method analytes in this method can also be found in many common laboratory supplies and equipment, such as PTFE (polytetrafluoroethylene) products, LC solvent lines, methanol, aluminum foil, SPE sample transfer lines, etc. All items such as these must be routinely demonstrated to be free from interferences (less than 1/2 the RL for each method analyte) under the conditions of the analysis by analyzing laboratory reagent blanks as described in Section 9.1. Subtracting blank values from sample results is not permitted.

4.3 Matrix interferences may be caused by contaminants that are co-extracted from the sample. The extent of matrix interferences will vary considerably from source to source, depending upon the nature of the water. Humic and/or fulvic material can be co-extracted during SPE and high levels can cause enhancement and/or suppression in the electrospray ionization source or low recoveries on the SPE sorbent. Total organic carbon (TOC) is a good indicator of humic content of the sample.

4.4 SPE cartridges can be a source of interferences. The analysis of field and laboratory reagent blanks can provide important information regarding the presence or absence of such interferences. Brands and lots of SPE devices should be tested to ensure that contamination does not preclude analyte identification and quantitation.

5. Health and Safety

5.1 The toxicity or carcinogenicity of each reagent and standard used in this method is not fully established; however, each chemical compound should be treated as a potential health hazard. From this viewpoint, exposure to these chemicals must be reduced to the lowest possible level by whatever means available. A reference file of material safety data sheets is available to all personnel involved in the chemical analysis. Additional references to laboratory safety are available in the Chemical Hygiene Plan.

5.2 All personnel handling environmental samples known to contain or to have been in contact with municipal waste must follow safety practices for handling known disease causative agents.

5.3 PFOA has been described as “likely to be carcinogenic to humans.” Pure standard materials and stock standard solutions of these method analytes should be handled with suitable protection to skin and eyes, and care should be taken not to breathe the vapors or ingest the materials.

6. Sample Collection, Preservation, Shipping and Handling

6.1 Sample Collection for Aqueous Samples

6.1.1 Samples must be collected in two (2) 500-mL or 250-mL high density polyethylene (HDPE) container with an unlined plastic screw cap. All sample containers must have linerless HDPE or polypropylene caps.

6.1.2 The sample handler must wash their hands before sampling and wear nitrile gloves while filling and sealing the sample bottles. PFAS contamination during sampling can occur from a number of common sources, such as food packaging and certain foods and beverages. Proper hand washing and wearing nitrile gloves will aid in minimizing this type of accidental contamination of the samples.

6.1.3 Open the tap and allow the system to flush until the water temperature has stabilized (approximately 3 to 5 min). Collect samples from the flowing system.

6.1.4 Fill sample bottles. Samples do not need to be collected headspace free.

6.1.5 After collecting the sample and cap the bottle. Keep the sample sealed from time of collection until extraction.

6.1.6 Maintain all aqueous samples protected from light at 0 - 6 ºC from the time of collection until shipped to the laboratory. Samples must be shipped as soon as practical with sufficient ice to maintain the sample temperature below 6 ºC during transport and be received by the laboratory within 48 hours of collection. The laboratory must confirm that the sample temperature is 0 - 6 ºC upon receipt. Once received by the laboratory, the samples must be stored at ≤ -20 ºC until sample preparation.

6.2 Sample Collection for Soil and Sediment samples.

6.2.1 Grab samples are collected in polypropylene containers. Sample containers and contact surfaces containing PTFE shall be avoided. Samples should fill no more than ¾ full.

6.2.2 Maintain solid samples protected from light (in HDPE containers) at 0 - 6 ºC from the time of collection until receipt at the laboratory. The laboratory must confirm that the sample temperature is 0 - 6 ºC upon receipt. Once received by the laboratory, the samples must be stored at ≤ -20 ºC until sample preparation.

6.3 Sample Collection for fish and other tissue samples

6.3.1 Once received by the laboratory, the samples must be maintained protected from light at ≤ -20 ºC until prepared. Store unused samples in HDPE containers or wrapped in aluminum foil at ≤ -20 ºC.

6.3.2 The nature of the tissues of interest may vary by project. Field sampling plans and protocols should explicitly state the samples to be collected and if any processing will be conducted in the field (e.g., filleting of whole fish or removal of organs). All field procedures must involve materials and equipment that have been shown to be free of PFAS.

6.4 Sample Preservation

Not applicable.

6.5 Sample Shipping

Samples must be chilled during shipment and must not exceed 0 – 6 °C during the first 48 hours after collection. Sample temperature must be confirmed to be at or below 0 – 6 °C when the samples are received at the laboratory. Samples stored in the lab must be held at or below 6 °C until extraction but should not be frozen.

NOTE: Samples that are significantly above 0 – 6 ° C, at the time of collection, may need to be iced or refrigerated for a period of time, in order to chill them prior to shipping. This will allow them to be shipped with sufficient ice to meet the above requirements.

6.6 Sample Handling

6.6.1 Aqueous samples (including leachates) should be analyzed as soon as possible; however, samples may be held in the laboratory for up to 90 days from collection, when stored at ≤ -20 ºC and protected from the light. When stored at 0 - 6 ºC and protected from the light, aqueous samples may be held for up to 28 days, with the caveat that issues were observed with certain perfluorooctane sulfonamide ethanols and perfluorooctane sulfonamidoacetic acids after 7 days. These issues are more likely to elevate the observed concentrations of other PFAS compounds via the transformation of these precursors if they are present in the sample.

6.6.2 Solid samples (soils and sediments) and tissue samples may be held for up to 90 days, if stored by the laboratory in the dark at either 0 - 6 ºC or ≤ -20 ºC, with the caveat that samples may need to be extracted as soon as possible if NFDHA is an important analyte.

6.6.3 Biosolids samples may be held for up to 90 days, if stored by the laboratory in the dark at 0 - 6 ºC or at -20 ºC. Because microbiological activity in biosolids samples at 0 - 6 ºC may lead to production of gases which may cause the sample to be expelled from the container when it is opened, as well as producing noxious odors, EPA recommends that samples be frozen if they need to be stored for more than a few days before extraction. Store sample extracts in the dark at less than 0 - 4 ºC until analyzed. If stored in the dark at less than 0 - 4 ºC, sample extracts may be stored for up to 90 days, with the caveat that issues were observed for some ether sulfonates after 28 days. These issues may elevate the observed concentrations of the ether sulfonates in the extract over time. Samples may need to be extracted as soon as possible if NFDHA is an important analyte.

7. Equipment and Supplies

7.1 SAMPLE CONTAINERS – 500-mL or 250-mL high density polyethylene (HDPE) bottles fitted with unlined screw caps. Sample bottles must be discarded after use.

7.2 SAMPLE JARS – 8-ounce wide mouth high density polyethylene (HDPE) bottles fitted with unlined screw caps. Sample bottles must be discarded after use.

7.3 POLYPROPYLENE BOTTLES – 4-mL narrow-mouth polypropylene bottles.

7.4 CENTRIFUGE TUBES – 50-mL conical polypropylene tubes with polypropylene screw caps for storing standard solutions and for collection of the extracts.

7.5 AUTOSAMPLER VIALS – Polypropylene 0.7-mL autosampler vials with polypropylene caps.

7.5.1 NOTE: Polypropylene vials and caps are necessary to prevent contamination of the sample from PTFE coated septa. However, polypropylene caps do not reseal, so evaporation occurs after injection. Thus, multiple injections from the same vial are not possible.

7.6 POLYPROPYLENE GRADUATED CYLINDERS – Suggested sizes include 25, 50, 100 and 1000-mL cylinders.

7.7 Auto Pipets – Suggested sizes include 5, 10, 25, 50, 100, 250, 500, 1000, 5000 and 10,000-µls.

7.8 PLASTIC PIPETS – Polypropylene or polyethylene disposable pipets.

7.9 Silanized glass wool (Sigma-Aldrich, Cat # 20411 or equivalent) – store in a clean glass jar and rinsed with methanol (2 times) prior to use.

7.10 Disposable syringe filter, 25-mm, 0.2-µm Nylon membrane, PALL/Acrodisc or equivalent

7.11 Variable volume pipettes with disposable HDPE or polypropylene tips (10 µL to 5 mL) used for preparation of calibration standards and spiked samples.

7.12 ANALYTICAL BALANCE – Capable of weighing to the nearest 0.0001 g.

7.13 ANALYTICAL BALANCE – Capable of weighing to the nearest 0.1 g.

7.14 SOLID PHASE EXTRACTION (SPE) APPARATUS FOR USING CARTRIDGES

7.14.1 SPE CARTRIDGES – (Waters Oasis WAX 150 mg, Cat # 186002493 or equivalent). The SPE sorbent must have a pKa above 8 so that it remains positively charged during the extraction.

7.14.1.1 Note: SPE cartridges with different bed volume (e.g., 500 mg) may be used; however, the laboratory must demonstrate that the bed volume does not negatively affect analyte absorption and elution, by performing the initial demonstration of capability analyses described in Section.

7.14.2 VACUUM EXTRACTION MANIFOLD – A manual vacuum manifold with large volume sampler for cartridge extractions, or an automatic/robotic sample preparation system designed for use with SPE cartridges, may be used if all QC requirements discussed in Section 9 are met. Extraction and/or elution steps may not be changed or omitted to accommodate the use of an automated system. Care must be taken with automated SPE systems to ensure the PTFE commonly used in these systems does not contribute to unacceptable analyte concentrations in the MB.

7.14.3 SAMPLE DELIVERY SYSTEM – Use of a polypropylene transfer tube system, which transfers the sample directly from the sample container to the SPE cartridge, is recommended, but not mandatory. Standard extraction manifolds come equipped with PTFE transfer tube systems. These can be replaced with 1/8” O.D. x 1/16” I.D. polypropylene or polyethylene tubing cut to an appropriate length to ensure no sample contamination from the sample transfer lines. Other types of non-PTFE tubing may be used provided it meets the MB and LCS QC requirements.

7.15 EXTRACT CONCENTRATION SYSTEM – Extracts are concentrated by evaporation with nitrogen using a water bath set no higher than 55 °C.

7.16 LABORATORY OR ASPIRATOR VACUUM SYSTEM – Sufficient capacity to maintain a vacuum of approximately 10 to 15 inches of mercury for extraction cartridges.

7.17 LIQUID CHROMATOGRAPHY (LC)/TANDEM MASS SPECTROMETER (MS/MS) WITH DATA SYSTEM

7.17.1 LC SYSTEM – Instrument capable of reproducibly injecting up to 10-µL aliquots and performing binary linear gradients at a constant flow rate near the flow rate used for development of this method (0.4 mL/min). The LC must be capable of pumping the water/methanol mobile phase without the use of a degasser which pulls vacuum on the mobile phase bottle (other types of degassers are acceptable). Degassers which pull vacuum on the mobile phase bottle will volatilize the ammonium acetate mobile phase causing the analyte peaks to shift to earlier retention times over the course of the analysis batch. The usage of a column heater is optional.

7.17.2 LC/TANDEM MASS SPECTROMETER – The LC/MS/MS must be capable of negative ion electrospray ionization (ESI) near the suggested LC flow rate of 0.4 mL/min. The system must be capable of performing MS/MS to produce unique product ions for the method analytes within specified retention time segments. A minimum of 10 scans across the chromatographic peak is required to ensure adequate precision.

7.17.3 DATA SYSTEM – An interfaced data system is required to acquire, store, reduce, and output mass spectral data. The computer software should have the capability of processing stored LC/MS/MS data by recognizing an LC peak within any given retention time window. The software must allow integration of the ion

abundance of any specific ion within specified time or scan number limits. The software must be able to calculate relative response factors, construct linear regressions or quadratic calibration curves, and calculate analyte concentrations.

7.17.4 INSTRUMENT COLUMNS

7.17.4.1 ANALYTICAL: C18 column, 1.7 µm, 50 x 2.1 mm (Waters Acquity UPLC® BEH or equivalent)

7.17.4.2 OPTIONAL GUARD COLUMN: (Phenomenex Kinetex® Evo C18 or equivalent)

8. Reagents and Standards

8.1 GASES, REAGENTS, AND SOLVENTS – Reagent grade or better chemicals must be used.

8.1.1 REAGENT WATER – Purified water which does not contain any measurable quantities of any method analytes or interfering compounds greater than 1/2 the RL for each method analyte of interest. Prior to daily use, at least 3 L of reagent water should be flushed from the purification system to rinse out any build-up of analytes in the system's tubing.

8.1.2 METHANOL (CH_3OH, CAS#: 67-56-1) – High purity, demonstrated to be free of analytes and interferences.

8.1.3 AMMONIUM ACETATE ($NH_4C_2H_3O_2$, CAS#: 631-61-8) – High purity, demonstrated to be free of analytes and interferences.

8.1.4 ACETIC ACID (H_3CCOOH, CAS#: 64-19-7) - High purity, demonstrated to be free of analytes and interferences.

8.1.5 1M AMMONIUM ACETATE/REAGENT WATER – High purity, demonstrated to be free of analytes and interferences.

8.1.6 2mM AMMONIUM ACETATE/METHANOL:WATER (5:95) – To prepare, mix 2 ml of 1M AMMONIUM ACETATE,1 ml ACETIC ACID and 50 ml METHANOL into I Liter of REAGENT WATER.

8.1.7 ACETONITRILE – UPLC grade or equivalent, store at room temperature

8.1.8 TOLUENE – HPLC grade or equivalent.

8.1.9 ACETONE – pesticide grade or equivalent

8.1.10 AMMONIUM ACETATE – (Caledon Ultra LC/MS grade or equivalent

8.1.11 AMMONIUM HYDROXIDE (NH_3, CAS#: 1336-21-6) – High purity, demonstrated to be free of analytes and interferences.

8.1.12 METHANOLIC AMMONIUM HYDROXIDE (0.3%) - add ammonium hydroxide (1 mL, 30%) to methanol (99 mL), store at room temperature, replace after 1 month

8.1.13 METHANOLIC AMMONIUM HYDROXIDE (1%) - add ammonium hydroxide (3.3 mL, 30%) to methanol (97 mL), store at room temperature, replace after 1 month

8.1.14 METHANOLIC AMMONIUM HYDROXIDE (2%) - add ammonium hydroxide (6.6 mL, 30%) to methanol (93.4 mL), store at room temperature, replace after 1 month

8.1.15 METHANOLIC POTASSIUM HYDROXIDE (0.05 M) – add 3.3 g of potassium hydroxide to 1 L of methanol, store at room temperature, replace after 3 months

8.1.16 METHANOL WITH 4% WATER, 1% AMMONIUM HYDROXIDE AND 0.625% ACETIC ACID - add ammonium hydroxide (3.3 mL, 30%), reagent water (1.7 mL) and acetic acid (0.625 mL) to methanol (92 mL), store at room temperature, replace after 1 month. This solution is used to prepare the instrument blank and calibration standards (Section 8.3.2).

8.1.17 FORMIC ACID – (greater than 96% purity or equivalent).

8.1.18 FORMIC ACID (aqueous, 0.1 M) - dissolve formic acid (4.6 g) in reagent water (1 L), store at room temperature, replace after 2 years

8.1.19 FORMIC ACID (aqueous, 0.3 M) - dissolve formic acid (13.8 g) in reagent water (1 L), store at room temperature, replace after 2 years

8.1.20 FORMIC ACID (aqueous, 5% v/v) - mix 5 mL formic acid with 95 mL reagent water, store at room temperature, replace after 2 years

8.1.21 FORMIC ACID (methanolic 1:1, 0.1 M formic acid/methanol) - mix equal volumes of methanol and 0.1 M formic acid, store at room temperature, replace after 2 years

8.1.22 FORMIC ACID (aqueous, 50% v/v) - mix 50 mL formic acid with 50 mL reagent water, store at room temperature, replace after 2 years

8.1.23 POTASSIUM HYDROXIDE – certified ACS or equivalent

8.1.24 CARBON - – EnviCarb® 1-M-USP or equivalent, verified by lot number before use, store at room temperature. Loose carbon allows for better adsorption of interferent organics. Note: The single-laboratory validation laboratory achieved better performance with loose carbon than carbon cartridges. Loose carbon will be used for the multi-laboratory validation to set statistically based method criteria.

8.1.25 NITROGEN – Used for the following purposes: Nitrogen aids in aerosol generation of the ESI liquid spray and is used as collision gas in some MS/MS instruments. The nitrogen used should meet or exceed instrument

manufacturer's specifications. In addition, Nitrogen is used to concentrate sample extracts (Ultra High Purity or equivalent).

8.1.26 ARGON – Used as collision gas in some MS/MS instruments. Argon should meet or exceed instrument manufacturer's specifications. Nitrogen gas may be used as the collision gas provided sufficient sensitivity (product ion formation) is achieved.

8.2 REFERENCE MATRICES - Matrices in which PFAS and interfering compounds are not detected by this method. These matrices are to be used to prepare the batch QC samples.

8.2.1 Reagent water - purified water, Type I

8.2.2 Solid reference matrix Ottawa Sand or equivalent

8.2.3 Tissue Reference matrix – Cod loin or other animal tissue demonstrated to be PFAS free

8.3 STANDARD SOLUTIONS – When a compound purity is assayed to be 96% or greater, the weight can be used without correction to calculate the concentration of the stock standard. PFAS analyte and IS standards commercially purchased in glass ampoules are acceptable; however, all subsequent transfers or dilutions performed by the analyst must be prepared and stored in polypropylene containers and are stored at ≤4 °C. Standards for sample fortification generally should be prepared in the smallest volume that can be accurately measured to minimize the addition of excess organic solvent to aqueous samples.

8.3.1 Stock standards and diluted stock standards are stored at ≤4 °C. Prepare a spiking solution, containing the method analytes listed in Table 1, in methanol from prime stocks. The solution is used to prepare the calibration standards and to spike the known reference QC samples that are analyzed with every batch. Quantitative standards containing a mixture of branched and linear isomers must be used for method analytes if they are commercially available. Currently, these include PFOS, PFHxS, NEtFOSAA, and NMeFOSAA.

8.3.2 Calibration standard solutions – A series of calibration solutions containing the target analytes and the Labeled extracted internal standards (EIS) and non-extracted internal standards (NIS) is used to establish the initial calibration of the analytical instrument. Table 4 represents the concentrations of the native, EIS and NIS analytes of the calibration curve. Calibration standard solutions are made using the solution described in section 8.1.16.

8.3.3 ISOTOPE DILUTION EXTRACTED INTERNAL STANDARD (EIS) – Isotopically labelled analogs of the target analytes to be used for the quantification of target analytes. EIS stock standard solutions are purchased in glass ampoules and are stored in accordance with the manufacturer's recommendations. The EIS stock solution to be used for the fortification of samples and QC in accordance with the isotope dilution procedure. Table 2 represents the EIS concentrations and nominal sample amounts added to each field sample and QC element.

8.3.4 ISOTOPE DILUTION NON-EXTRACTED INTERNAL STANDARDS (NIS) – Isotopically labelled analogs to be added post extraction for the measurement of EIS extraction efficiency and is added to the final volume of all extractions. Table 3 represents the EIS concentrations and nominal sample amounts added to each field sample and QC element.

9. Quality Control

9.1 Method Blank

9.1.1 A Method Blank (MB) is required with each extraction batch to confirm that potential background contaminants are not interfering with the identification or quantitation of method analytes. An aliquot of reagent water that is treated exactly as a sample including exposure to all glassware, equipment, solvents, reagents and standards. Prep and analyze a MB for every 20 samples. If the MB produces a peak within the retention time window of any analyte that would prevent the determination of that analyte, determine the source of contamination, and eliminate the interference before processing samples. Background contamination must be reduced to an acceptable level before proceeding. Background from method analytes or other contaminants that interfere with the measurement of method analytes must be below the RL. If the method analytes are detected in the MB at concentrations equal to or greater than this level, then all data for the problem analyte(s) must be considered invalid for all samples in the extraction batch.

9.2 Laboratory Control Sample (LCS)

9.2.1 Low Level LCS or OPR (Ongoing Precision Recovery) sample is required with each extraction batch. A LLCS or OPR samples is a method blank spiked with known quantities of analytes. The fortified concentration of the LCS is spiked at 2X the LOQ. Default limits of 70-130% of the true value may be used for analytes until sufficient replicates have been analyzed to generate proper control limits. Calculate the percent recovery (%*R*) for each analyte using the equation:

9.2.2 An LCS or OPR (Ongoing Precision Recovery) sample is required with each extraction batch. A LCS or OPR samples is a method blank spiked with known quantities of analytes. The fortified concentration of the LCS is spiked at the midpoint of the calibration curve. Default limits of 70-130% of the true value may be used for analytes until sufficient replicates have been analyzed to generate proper control limits. Calculate the percent recovery (%*R*) for each analyte using the equation:

$$\%R = \frac{A \times 100}{B}$$

Where:

A = measured concentration in the fortified sample
B =fortification concentration.

9.1.1 Where applicable, in the absence of additional sample volume required to perform matrix specific QC, LCSD's are to be extracted and analyzed. The concentration and analyte recovery criteria for the LCSD must be the same as the batch LCS The RSD's must fall within ≤30% of the true value for medium and high-level replicates, and ≤50% for low level replicates. Calculate the relative percent difference (RPD) for duplicate MSs (MS and MSD) using the equation:

$$RPD = \frac{|LCS - LCSD|}{(LCS + LCSD) / 2} \times 100$$

9.1.2 If the LCS and or LCSD results do not meet these criteria for method analytes, then all data for the problem analyte(s) must be considered invalid for all samples in the extraction batch.

9.3 Non-extracted Internal Standard Area (NIS)

Each time an initial calibration is performed, use the data from all the initial calibration standards used to meet the linearity test in Section 10.3.3.3 to calculate the mean area response for each of the NIS compounds, using the equation below.

$$\text{Mean Area}_{NISi} = \sum AREA_{NISi} / n$$

where:

AreaNISi = Area counts for the ith NIS, where i ranges from 1 to 7, for the seven NIS compounds listed in Table 1
n = The number of ICAL standards (the default value is n = 6). If a different number of standards is used for the ICAL, for example, to increase the calibration range or by dropping a point at either end of the range to meet the linearity criterion, change 6 to match the actual number of standards used)
Record the mean areas for each NIS for use in evaluating results for sample analyses. There is no acceptance criterion associated with the mean NIS area data.

9.4 Extracted Internal Standards (EIS)

9.4.1 The EIS standard is fortified into all samples, CCVs, MBs, LCSs, MSs, MSDs, FD, and FRB prior to extraction. It is also added to the CAL standards. The EIS is a means of assessing method performance from extraction to final chromatographic measurement. Calculate the recovery (%R) for the EIS using the following equation:

$$\%R = (A / B) \times 100$$

Where:

A = calculated EIS concentration for the QC or Field Sample
B = fortified concentration of the EIS.

9.4.2 Default limits of 50-150% may be used for analytes until sufficient replicates have been analyzed to generate proper control limits. A low or high percent recovery for a sample, blank, or CCV does not require discarding the analytical data but it may indicate a potential problem with future analytical data. When EIS recovery from a sample, blank, or CCV are outside control limits, check 1) calculations to locate possible errors, 2) standard solutions for degradation, 3) contamination, and 4) instrument performance. For CCVs and QC elements spiked with all target analytes, if the recovery of the corresponding target analytes meet the acceptance criteria for the EIS in question, the data can be used but all potential

biases in the recovery of the EIS must be documented in the sample report. If the associated target analytes do not meet the acceptance criteria, the data must be reanalyzed.

9.5 Matrix Spike (MS/MSD)

9.5.1 Analysis of an MS is prepared one per preparation batch (if required).

9.5.2 Aliquots of field samples that have been fortified with a known concentration of target compounds, prior to sample preparation and extraction, and analyzed to measure the effect of matrix interferences. The use of MS/MSD samples is generally not required in isotope dilution methods because the labeled compounds added to every sample provide more performance data than spiking a single sample in each preparation batch. Aliquots of field samples

9.5.3 Analyte recoveries may exhibit matrix bias. For samples fortified at or above their native concentration, recoveries should range between 50-150%. If the accuracy of any analyte falls outside the designated range, and the laboratory performance for that analyte is shown to be in control in the LCS, the recovery is judged to be matrix biased. The result for that analyte in the unfortified sample is labeled suspect/matrix to inform the data user that the results are suspect due to matrix effects.

9.6 Laboratory Duplicate

9.6.1 FIELD DUPLICATE OR LABORATORY FORTIFIED SAMPLE MATRIX DUPLICATE (FD or MSD) – Within each extraction batch (not to exceed 20 Field Samples), a minimum of one FD or MSD must be analyzed. Duplicates check the precision associated with sample collection, preservation, storage, and laboratory procedures. If method analytes are not routinely observed in Field Samples, an MSD should be analyzed rather than an FD.

9.6.2 Calculate the relative percent difference (*RPD*) for duplicate measurements (*FD1* and *FD2*) using the equation:

$$RPD = \frac{|FD1 - FD2|}{(FD1 + FD2) / 2} \times 100$$

9.6.3 RPDs for FDs should be ≤30%. Greater variability may be observed when FDs have analyte concentrations that are within a factor of 2 of the RL. At these concentrations, FDs should have RPDs that are ≤50%. If the RPD of any analyte falls outside the designated range, and the laboratory performance for that analyte is shown to be in control in the CCV, the recovery is judged to be matrix biased. The result for that analyte in the unfortified sample is labeled suspect/matrix to inform the data user that the results are suspect due to matrix effects.

9.6.4 If an MSD is analyzed instead of a FD, calculate the relative percent difference (RPD) for duplicate MSs (MS and MSD) using the equation:

$$RPD = \frac{|MS - MSD|}{(MS + MSD) / 2} \times 100$$

9.6.5 RPDs for duplicate MSs should be ≤30% for samples fortified at or above their native concentration. Greater variability may be observed when MSs are fortified at analyte concentrations that are within a factor of 2 of the RL. MSs fortified at these concentrations should have RPDs that are ≤50% for samples fortified at or above their native concentration. If the RPD of any analyte falls outside the designated range, and the laboratory performance for that analyte is shown to be in control in the LCSD where applicable, the result is judged to be matrix biased. If no LCSD is present, the associated MS and MSD are to be re-analyzed to determine if any analytical has occurred. If the resulting RPDs are still outside control limits, the result for that analyte in the unfortified sample is labeled suspect/matrix to inform the data user that the results are suspect due to matrix effects.

9.7 Bile Salt Interference Check

9.7.1 The laboratory must analyze a TDCA standard after the initial calibration, prior to the analysis of tissue samples, to check for interferences caused by bile salts. If an interference is present, the chromatographic conditions must be modified to eliminate the interference from TDCA (e.g., changing the retention time of TDCA such that it falls outside the

9.8 Initial Calibration Verification (ICV)

9.8.1 After each ICAL, analyze a QCS sample from a source different from the source of the CAL standards. If a second vendor is not available, then a different lot of the standard should be used. The QCS should be prepared and analyzed just like a CCV. Acceptance criteria for the QCS are identical to the CCVs; the calculated amount for each analyte must be ± 30% of the expected value. If measured analyte concentrations are not of acceptable accuracy, check the entire analytical procedure to locate and correct the problem.

9.9 Instrument Sensitivity Check (ISC)

9.9.1 At the start of each 12-hour shift, analyze a standard at the LOQ. The signal-to-noise ratio of the ISC standard must be greater than or equal to 3:1. If the requirements cannot be met, the problem must be corrected before analyses can proceed

9.10 Continuing Calibration Verification (CCV)

9.10.1 CCV Standards must be analyzed at the beginning of each analysis batch, after every 10 Field Samples, and at the end of the analysis batch.

9.10.2 The recovery of native and isotopically labeled compounds for the CVs must be within 70 - 130%

9.10.3

9.11 Method-specific Quality Control Samples

9.11.1 Instrument Blank – During the analysis of a batch of samples, a solvent blank is analyzed after samples containing high level of target compounds (e.g., calibration, CV) to monitor carryover from the previous injection. The injection blank consists of the solution in

Section 8.1.16 fortified with the EIS and NIS for quantitation purposes.

9.12 Example Method Sequence

- INSTRUMENT BLANK
- INSTRUMENT SENSITIVITY CHECK
- CALIBRATION VERIFICATION STANDARD
- QUALITATIVE IDENTIFICATION STANDARDS
- TDCA STANDARD (only if analyzing tissues)
- INSTRUMENT BLANK
- METHOD BLANK
- LOW-LEVEL LCS/OPR
- OPR/LCS
- SAMPLE (10 or fewer)
- CALIBRATION VERIFICATION STANDARD
- INSTRUMENT BLANK
- SAMPLE (10 or fewer)
- CALIBRATION VERIFICATION STANDARD
- INSTRUMENT BLANK

10. Procedure

10.1 Equipment Set-up

10.1.1 This procedure may be performed manually or in an automated mode using a robotic or automatic sample preparation device. If an automated system is used to prepare samples, follow the manufacturer's operating instructions, but all extraction and elution steps must be the same as in the manual procedure. Extraction and/or elution steps may not be changed or omitted to accommodate the use of an automated system. If an automated system is used, the MBs should be rotated among the ports to ensure that all the valves and tubing meet the MB requirements.

10.1.2 Some of the PFAS's adsorb to surfaces, including polypropylene. Therefore, the aqueous sample bottles must be rinsed with the elution solvent whether extractions are performed manually or by automation. The bottle rinse is passed through the cartridge to elute the method analytes and is then collected.

10.1.3 The SPE cartridges and sample bottles described in this section are designed as single use items and should be discarded after use. They may not be refurbished for reuse in subsequent analyses.

10.1.4 All SPE apparatus, including manifolds, tubing and sample ports must be thoroughly rinsed following each use with 1% methanolic ammonium hydroxide, followed by Methanol and then DI water. Additionally, sample manifold ports and transfer tubing should be inspected regularly for signs of wear and/or discoloration. When such observations are made, the associated components should be replaced.

10.1.5 Prior to the start of any extraction, sample site information must be evaluated for any potentially high level PFAS concentrations or sample matrix irregularities that may impact the extraction process. If such samples are identified, aqueous samples may be pre-screened via direct aqueous injection prior to analysis to estimate the potential PFAS concentrations present.

10.1.6 To perform a direct aqueous injection (DAI) screen, the sample should be inverted several times to try and evenly disperse any organic matter present. A 1 ml aliquot (or less depending on the matrix) is to be taken from the parent sample, volume adjusted to 1 ml with reagent water if less than 1ml, fortified with EIS and NIS spiking solutions to match the concentrations of an extracted sample (typically 5 µl per 1 ml DAI), and then analyzed under the same analytical conditions as field samples.

10.2 Sample Preparation of Aqueous Samples

10.2.1 Samples are preserved, collected, and stored as presented in Section 6.

10.2.2 Determine sample volume. Weigh all samples to the nearest 1g. If visible sediment is present, centrifuge and decant into a new HDPE bottle and record the weight of the new container.

NOTE: Some of the PFAS's adsorb to surfaces, thus the sample volume may not be transferred to a graduated cylinder for volume measurement.

10.2.3 The MB, LCS and FRB may be prepared by measuring reagent water with a polypropylene graduated cylinder or filling an HDPE sample bottle to near the top.

10.2.4 Check that the pH is 6.5 ± 0.5. If necessary, adjust pH with 50% formic acid or ammonium hydroxide and 3% aqueous ammonium hydroxide. The extract is now ready for solid-phase extraction (SPE) and cleanup.

10.2.5 Add 20 µL of the EIS to each sample and QC, cap and invert to mix.

10.2.6 If the sample is an LCS, LCSD, MS, or MSD, add the necessary amount of analyte PDS. Cap and invert each sample to mix.

10.3 Sample Prep and Extraction Protocol for Soils, Solids and Sediments.

10.3.1 Homogenize and weigh 5 grams of sample (measured to the nearest hundredth of a gram) into a 50 ml polypropylene centrifuge tube. For laboratory control blanks and spikes, 5 grams of clean sand is used.

10.3.1.1 For Biosolids and other complex matrices, a small aliquot may be required due to co-extracted matrix interferences.

10.3.1.2 For batch QC samples using 5 g of reference solid, add 2.5 g of reagent water. The addition of reagent water to the sand provides a matrix closer in composition to real-world samples.

10.3.2 Add 20 µL of the EIS to each sample and QC.

10.3.3 If the sample is an LCS, LCSD, MS, or MSD, add the necessary amount of analyte PDS. Cap and invert each sample to mix.

10.3.4 Vortex the samples to evenly disperse the spiking solutions and allow to equilibrate for 30 minutes.

10.3.5 To all samples, add 10 ml of 0.3% methanolic ammonium hydroxide, cap, vortex for 25 seconds.

10.3.6 Following mixing, shake each sample for 30 minutes on a shaker table.

10.3.7 Centrifuge each sample at 2800RPM for 10 minutes.

10.3.8 Remove the supernatant and transfer to a clean 50 ml polypropylene centrifuge tube.

10.3.9 Repeat steps 10.3.4 to 10.3.7, with 15 ml of 0.3% methanolic ammonium hydroxide, combining the supernatants.

10.3.10 Add 5ml of 0.3% methanolic ammonium hydroxide to the sample, vortex for 25 seconds and centrifuge each sample at 2800RPM for 10 minutes.

10.3.11 Remove the supernatant and transfer to the same 50 ml polypropylene centrifuge tube containing eluates from the previous cycles.

10.3.12 Add 10 mg of carbon to the combined extract, mix by occasional hand shaking for no more than five minutes and then centrifuge at 2800 rpm for 10 minutes. Immediately decant the extract into a 50 ml polypropylene centrifuge tube.

10.3.13 Dilute to approximately 35 mL with reagent water. Samples containing more than 50% water may yield extracts that are greater than 35 mL in volume; therefore, do not add water to these. Determine the water content in the sample as follows (percent moisture is determined from the % solids):

Water Content in Sample = (Sample Weight * Percent moisture) / 100

10.3.14 Concentrate each extract at approximately 55 ºC with a gentle N2 flow to a final volume that is based on the water content of the sample (see table below). Allow extracts to concentrate for 10 minutes, then mix (by vortex if the volume is < 20. Continue concentrating and mixing every 5 minutes until the extract has been reduced to the required volume as specified in the table below. If the extract volume appears to stop dropping, the concentration must be stopped and the volume at which it was stopped recorded.

Water Content in Sample	Concentrated Final Volume
< 5 grams	15 ml
5-8 grams	15-20 ml
8-9 grams	20-22.5 ml
9-10 grams	22.5-25 ml

10.3.15 Add 40 - 50 mL of reagent water to the extract and vortex. Check that the pH is 6.5 ±0.5 and adjust as necessary with 50% formic acid or 30% ammonium

hydroxide, or with 5% formic acid and 3% aqueous ammonium hydroxide. The extracts are ready for SPE and cleanup.

10.4 Sample Prep and Extraction Protocol for Tissues.

10.4.1 Homogenize and weigh 2 grams of sample (measured to the nearest hundredth of a gram) into a 50 ml polypropylene centrifuge tube. For laboratory control blanks and spikes, 2 grams of clean tissue is used.

10.4.2 Add 20 µL of the EIS PDS to each sample and QC.

10.4.3 If the sample is an LCS, LCSD, MS, or MSD, add the necessary amount of analyte PDS. Cap and invert each sample to mix.

10.4.4 Add 10 mL of 0.05M KOH in methanol to each sample. Vortex to disperse the tissue then place tubes on a mixing table to extract for at 16 hours. Centrifuge at 2800 rpm for 10 minutes and collect the supernatant in a 50-mL polypropylene centrifuge tube.

10.4.5 Add 10 mL of acetonitrile to remaining tissue in the 50-mL centrifuge tube, vortex to mix and disperse the tissue. Sonicate for 30 minutes. Centrifuge at 2800 rpm for 10 minutes and collect the supernatant, adding it to the 50-mL centrifuge tube containing the initial extract.

10.4.6 Add 5 mL of 0.05M KOH in methanol to the remaining sample in each centrifuge tube. Vortex to disperse the tissue and hand mix briefly. Centrifuge at 2800 rpm for 10 minutes and collect the supernatant, adding it to the 50-mL centrifuge tube containing the first two extracts.

10.4.7 Add 10 mg of carbon to the combined extract, mix by occasional hand shaking over a period of no more than five minutes and then centrifuge at 2800 rpm for 10 minutes. Immediately decant the extract into a 50-mL centrifuge tube.

10.4.8 Add 1 mL of reagent water to each tube and concentrate each extract at approximately 55 ºC with a gentle N2 flow to a final volume of 2.5 ml.

10.4.9 Add reagent water to each evaporation/concentrator tube to dilute the extracts to 50 mL. Check that the pH = 6.5 ± 0.5 and adjust as needed with 50% formic acid, or ammonium hydroxide or with 5% formic acid and 3% aqueous ammonium hydroxide. The extracts are ready for SPE and cleanup.

10.5 SPE Extract: All matrices

10.5.1 Pack clean silanized glass wool to half the height of the WAX SPE cartridge barrel.

10.5.2 Pre-condition the cartridges by washing them with 3 X 5 mL of 1% methanolic ammonium hydroxide, discarding the wash volumes.

10.5.3 Rinse the cartridge with 5 mL of 0.3M formic acid, allowing the cartridge to drain using gravity only, discarding the rinse volume. Do not allow the cartridge to go dry

10.5.4 Adjust the vacuum so that the approximate flow rate is ~5 mL/min and load the sample across the cartridge. Do not allow the cartridge to go dry before all the sample has passed through.

10.5.5 Once all the sample has passed across the cartridge, rinse the walls of the reservoir with 2 X 5 mL reagent water, loading the rinse across the cartridge.

10.5.6 Rinse the walls of the reservoir with 5 mL of 1:1 0.1M formic acid/methanol and pass the rinse through the cartridge using vacuum. Dry the cartridge by pulling air through for 15 seconds.

10.5.7 Rinse the inside of the sample bottle with 5 mL of 1% methanolic ammonium hydroxide. Use vacuum to pull the elution solvent through the cartridge and into the collection tubes. When the cartridge bed and glass wool are submerged, stop the cartridge flow by closing the valve, keeping the sorbent bed and wool submerged.

10.5.8 Let the wetted sorbent bed and wool soak for 1 minute.

10.5.9 Open the cartridge valve and collect the eluate into a 15 ml polypropylene collection tube.

10.5.10 Add 25 µL of concentrated acetic acid to each sample eluted in the collection tubes and vortex to mix.

10.5.11 Add 10 mg of carbon to each sample and batch QC extract, using a 10-mg scoop. Handshake occasionally for no more than 5 minutes. It is important to minimize the time the sample extract is in contact with the carbon. Immediately vortex (30 seconds) and centrifuge at 2800 rpm for 10 minutes.

10.5.12 Add NIS solution to a clean collection tube. Place a syringe filter (25-mm filter, 0.2-µm nylon membrane) on a 5-mL polypropylene syringe. Take the plunger out and carefully decant the sample supernatant into the syringe barrel. Replace the plunger and filter the entire extract into the new collection tube containing the NIS.

10.5.13 Vortex to mix and transfer a portion of the extract into a .7-mL polypropylene LC vial for LC-MS/MS analysis. Cap the collection tube containing the remaining extract and store at 4 °C

10.6 Sample Volume Determination

10.6.1 If using weight to determine volume, weigh the empty bottle to the nearest 1 g and determine the sample weight by subtraction of the empty bottle weight from the original sample weight. Assume a sample density of 1.0 g/mL. In either case, the sample volume will be used in the final calculations of the analyte concentration.

10.7 Initial Calibration - Demonstration and documentation of acceptable initial calibration is required before any samples are analyzed. After the initial calibration is successful, a CCV is required at the beginning and end of each period in which analyses are performed, and after every tenth Field Sample.

10.7.1 ESI-MS/MS TUNE

10.7.1.1 Calibrate the mass scale of the MS with the calibration compounds and procedures prescribed by the manufacturer.

10.7.1.2 Optimize the [M-H]- or [M-CO_2]- for each method analyte by infusing approximately 0.5-1.0 µg/mL of each analyte (prepared in the initial mobile phase conditions) directly into the MS at the chosen LC mobile phase flow rate (0.4 mL/min). This tune can be done on a mix of the method analytes. The MS parameters (voltages, temperatures, gas flows, etc.) are varied until optimal analyte responses are determined.

The method analytes may have different optima requiring some compromise between the optima.

The Mass spec conditions found in Table 7 show the Sciex Triple Quad 5500+ operation conditions used in this method.

10.7.1.3 Optimize the product ion for each analyte by infusing approximately 0.5-1.0 µg/mL of each analyte (prepared in the initial mobile phase conditions) directly into the MS at the chosen LC mobile phase flow rate (approximately 0.4 mL/min). This tune can be done on a mix of the method analytes. The MS/MS parameters (collision gas pressure, collision energy, etc.) are varied until optimal analyte responses are determined. Typically, the carboxylic acids have very similar MS/MS conditions, and the sulfonic acids have similar MS/MS conditions.

The conditions found on table 5 are representative of expected tune optimizations for each analyte. If conditions other the ones close to the values provided in table 5 are achieved, the process should be re-performed and/or instrument maintenance performed to resolve the problem.

10.7.2 Establish LC operating parameters that optimize resolution and peak shape. Modifying the standard or extract composition to more aqueous content to prevent poor shape is not permitted.

Table 6 represents the operation conditions of a Sciex Exion LC system when running this method.

10.7.3 Inject 2µl of a mid-level CAL standard under LC/MS conditions to obtain the retention times of each method analyte. Divide the chromatogram into retention time windows each of which contains one or more chromatographic peaks. During MS/MS analysis, fragment a small number of selected precursor ions ([M-H]-) for the analytes in each window and choose the most abundant product ion. For maximum sensitivity, small mass windows of ±0.5 daltons around the product ion mass were used for quantitation.

10.7.4 Inject a mid-level CAL standard under optimized LC/MS/MS conditions to ensure that each method analyte is observed in its MS/MS window and that there are at least 10 scans across the peak for optimum precision.

NOTE: PFHxS, PFOS, NMeFOSAA, and NEtFOSAA have multiple chromatographic peaks using the LC conditions in Table 7 due to chromatographic resolution of the linear and branched isomers of these compounds. Most PFAS's are produced by two different processes. One process gives rise to linear PFAS's only while the other process produces both linear and branched isomers. Thus, both branched and linear PFAS's can potentially be found in the environment. For the aforementioned compounds that give rise to more than one peak, all the chromatographic peaks observed in the standard must be integrated and the areas totaled. Chromatographic peaks in a sample must be integrated in the same way as the CAL standard.

10.7.5 Prepare a set of CAL standards as outlined in table 5. The lowest concentration CAL standard must be at or below the LOQ.

10.7.6 The LC/MS/MS system is calibrated using the isotope dilution technique. Target analytes are quantitated against their isotopically labeled analog (Extracted Internal Standard) where commercially available. If a labeled analog is not

commercially available, the extracted internal standard with the closest retention time and /or closest chemical similarity is to be used. Use the LC/MS/MS data system software to generate a linear regression or quadratic calibration curve for each of the analytes. This curve must always be forced through zero and may be concentration weighted, if necessary. Forcing zero allows for a better estimate of the background levels of method analytes. A minimum of 5 levels are required for a linear calibration model and a minimum of 6 levels are required for a quadratic calibration model.

10.7.7 CALIBRATION ACCEPTANCE CRITERIA – A linear fit is acceptable if the calculated RSD or RSE for each target analyte is ≤20%. If linear or Quadratic regressions are used, coefficient of determination (r^2) values must be greater than 0.99. When quantitated using the initial calibration curve, each calibration point at or above the LOQ for each analyte must calculate to be within 70-130% of its true value. The calculate value of each EIS analyte must be within 50-150% of its true value. If these criteria cannot be met, corrective action is taken to reanalyze the CAL standards, restrict the range of calibration.

10.7.8 Bile salts interference check - The laboratory must analyze a TDCA standard after the initial calibration, prior to the analysis of tissue samples, to check for interferences caused by bile salts. If an interference is present, the chromatographic conditions must be modified to eliminate the interference from TDCA (e.g., changing the retention time of TDCA such that it falls outside the retention window for PFOS by at least one minute), and the initial calibration repeated.

10.8 CONTINUING CALIBRATION CHECK (CCV) – Minimum daily calibration verification is as follows. Verify the initial calibration at the beginning and end of each group of analyses, and after every tenth sample during analyses. In this context, a “sample” is considered to be a Field Sample. MBs, CCVs, LCSs, MSs, FDs FRBs and MSDs are not counted as samples. The beginning CCV of each analysis batch must be at or below the RL in order to verify instrument sensitivity prior to any analyses. If standards have been prepared such that all low CAL points are not in the same CAL solution, it may be necessary to analyze two CAL standards to meet this requirement. Alternatively, the analyte concentrations in the analyte PDS may be customized to meet these criteria. Subsequent CCVs should alternate between a medium and Low concentration CAL standard.

10.8.1 Inject an aliquot of the appropriate concentration CAL standard and analyze with the same conditions used during the initial calibration.

10.8.2 Calculate the concentration of each analyte and EIS in the CCV. The calculated amount for each native and EIS analyte for medium level CCVs must be within ± 30% of the true. If these conditions do not exist, then all data for the problem analyte must be considered invalid, and remedial action should be taken which may require recalibration. Any Field or QC Samples that have been analyzed since the last acceptable calibration verification should be reanalyzed after adequate calibration has been restored, with the following exception. If the CCV fails because the calculated concentration is greater than 130% for a particular method analyte, and Field Sample extracts show no detection for that method analyte, non-detects may be reported without re-analysis.

10.8.3 REMEDIAL ACTION – Failure to meet CCV QC performance criteria may require remedial action. Major maintenance, such as cleaning the electrospray probe, atmospheric pressure ionization source, cleaning the mass analyzer, replacing the LC column, etc., requires recalibration and verification of sensitivity by analyzing a CCV at or below the LOQ.

10.9 EXTRACT ANALYSIS

10.9.1 The same operating conditions used for the initial calibration and summarized in Tables 6 and 7 are to be used.

10.9.2 Prior to analysis of sample extracts, the Instrument mass calibration verification must be performed using standards whose mass range brackets the masses of interest and performed in the negative ion mode. The mass calibration is verified if the calculated mass is within ± .2 daltons of the specified mass.

10.9.3 Establish an appropriate retention time window for each analyte. This should be based on measurements of actual retention time variation for each method analyte in CAL standard solutions analyzed on the LC over the course of time. A value of plus or minus three times the standard deviation of the retention time obtained for each method analyte while establishing the initial calibration can be used to calculate a suggested window size. However, the experience of the analyst should weigh heavily on the determination of the appropriate retention window size.

10.9.4 Calibrate the system by either the analysis of a calibration curve or by confirming the initial calibration is still valid by analyzing a CCV.

10.9.5 Begin analyzing Field Samples, including QC samples, at their appropriate frequency by injecting the same size aliquots under the same conditions used to analyze the CAL standards.

10.9.6 For concentrations at or above the method LOQ, the total (branched and linear isomer) quantification ion response to the total (branched and linear isomer) confirmation ion response ratio must fall within ± 50% of the ratio observed in the midpoint initial calibration standard.

10.9.7 At the conclusion of data acquisition, use the same software that was used in the calibration procedure to identify peaks of interest in predetermined retention time windows. Use the data system software to examine the ion abundances of the peaks in the chromatogram. Identify an analyte by comparison of its retention time with that of the corresponding method analyte peak in a reference standard.

10.9.8 The analyst must not extrapolate beyond the established calibration range. If an analyte peak area exceeds the range of the initial calibration curve, the sample should be re-extracted with a reduced sample volume in order to bring the out of range target analytes into the calibration range. If a smaller sample size would not be representative of the entire sample, the following options are recommended. Re-extract an additional aliquot of sufficient size to ensure that it is representative of the entire sample. Spike it with a higher concentration of internal standard. Prior to LC/MS analysis, dilute the sample so that it has a concentration of internal standard equivalent to that present in the calibration standard. Then, analyze the diluted extract.3

10.9.9 In instances where re-extraction is not an option, dilute a subsample of the sample extract with 0.1% acetic acid by a factor no greater than 10x adjust the amount of the NIS in the diluted extract, and analyze the diluted extract. If the

responses for each EIS in the diluted extract meet the S/N and retention time, and the EIS recoveries from the analysis of the diluted extract are greater than 5%, then the compounds associated with those EISs may be quantified using isotope dilution. Use the EIS recoveries from the original analysis to select the dilution factor, with the objective of keeping the EIS recoveries in the dilution above that 5% lower limit. If the adjusted EIS recoveries are below 5%, the dilution is assumed invalid. If the adjusted EIS recoveries are greater than 5%, adjust the compound concentrations, detection limits, and minimum levels to account for the dilution.

11. Data Evaluation, Calculations and Reporting

11.1 Complete chromatographic resolution is not necessary for accurate and precise measurements of analyte concentrations using MS/MS. In validating this method, concentrations were calculated by measuring the product ions listed in Table 9.

11.2 Calculate analyte concentrations using the multipoint calibration established in Section 10.9. Do not use daily calibration verification data to quantitate analytes in samples. Adjust final analyte concentrations to reflect the actual sample volume determined in Section 10.8

C_{ex} = (Area of target analyte * Concentration of Labeled analog) / (area of labeled analog * CF)

C_s = (C_{ex} / sample volume in ml) * 1000

C_{ex} = The concentration of the analyte in the extract
CF = calibration factor from calibration.

11.3 Prior to reporting the data, the chromatogram should be reviewed for any incorrect peak identification or poor integration.

11.4 PFHxS, PFOS, PFOA, NMeFOSAA, and NEtFOSAA have multiple chromatographic peaks using the LC conditions in Table 7 due to the linear and branch isomers of these compounds (Sect. 10.10.4.). The areas of all the linear and branched isomer peaks observed in the CAL standards for each of these analytes must be summed and the concentrations reported as a total for each of these analytes.

11.5 Calculations must utilize all available digits of precision, but final reported concentrations should be rounded to an appropriate number of significant figures (one digit of uncertainty), typically two, and not more than three significant figures.

12. Contingencies for Handling Out-of-Control Data or Unacceptable Data

12.1 Section 9.0 outlines sample batch QC acceptance criteria. If non-compliant organic compound results are to be reported, the Organic Section Head and/or the Laboratory Director, and the Operations Manager must approve the reporting of these results. The laboratory Project Manager shall be notified and may choose to relay the non-compliance to the client, for approval, or other corrective action, such as re-sampling and re-analysis. The analyst, Data Reviewer, or Department Supervisor performing the secondary review initiates the project narrative, and the narrative must clearly document the non-compliance and provide a reason for acceptance of these results.

12.2 All results for the organic compounds of interest are reportable without qualification if extraction and analytical holding times are met, preservation requirements (including cooler temperatures) are met, all QC criteria are met, and matrix interference is not suspected during extraction or analysis of the samples. If any of the below QC parameters are not met, all associated samples must be evaluated for re-extraction and/or re-analysis.

13. Method Performance

13.1 Detection Limit Study (DL) / Limit of Detection Study (LOD) / Limit of Quantitation (LOQ)

13.1.1 The laboratory follows the procedure to determine the DL, LOD, and/or LOQ as outlined in Alpha SOP ID 1732. These studies performed by the laboratory are maintained on file for review.

13.2 Demonstration of Capability Studies

13.2.1 Refer to Alpha SOP ID 1739 for further information regarding IDC/DOC Generation.

13.2.2 The analyst must make a continuing, annual, demonstration of the ability to generate acceptable accuracy and precision with this method.

14. Pollution Prevention and Waste Management

14.1 Refer to Alpha's Chemical Hygiene Plan and Hazardous Waste Management and Disposal SOP for further pollution prevention and waste management information.

14.2 This method utilizes SPE to extract analytes from water. It requires the use of very small volumes of organic solvent and very small quantities of pure analytes, thereby minimizing the potential hazards to both the analyst and the environment as compared to the use of large volumes of organic solvents in conventional liquid-liquid extractions.

14.3 The analytical procedures described in this method generate relatively small amounts of waste since only small amounts of reagents and solvents are used. The matrices of concern are finished drinking water or source water. However, laboratory waste management practices must be conducted consistent with all applicable rules and regulations, and that laboratories protect the air, water, and land by minimizing and controlling all releases from fume hoods and bench operations. Also, compliance is required with any sewage discharge permits and regulations, particularly the hazardous waste identification rules and land disposal restrictions.

15. Referenced Documents

Chemical Hygiene Plan – ID 2124

SOP ID 1732 Detection Limit (DL), Limit of Detection (LOD) & Limit of Quantitation (LOQ) SOP

SOP ID 1739 Demonstration of Capability (DOC) Generation SOP

SOP ID 1728 Hazardous Waste Management and Disposal SOP

16. Attachments

Table 1: Names, Abbreviations, and CAS Registry Numbers for Target PFAS, Extracted Internal Standards and Non-extracted Internal Standards

Parameter	Acronym	CAS
PER- and POLYFLUOROALKYLETHER CARBOXYLIC ACIDS (PFECAs)		
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid	HFPO-DA	13252-13-6
4,8-dioxa-3H-perfluorononanoic acid	ADONA	919005-14-4
Perfluoro-3-methoxypropanoic acid	PFMPA	377-73-1
Perfluoro-4-methoxybutanoic acid	PFMBA	863090-89-5
Nonafluoro-3,6-dioxaheptanoic acid	NFDHA	151772-58-6
PERFLUOROALKYLCARBOXILIC ACIDS (PFCAs)		

Perfluorobutanoic acid	PFBA	375-22-4
Perfluoropentanoic acid	PFPeA	2706-90-3
Perfluorohexanoic acid	PFHxA	307-24-4
Perfluoroheptanoic acid	PFHpA	375-85-9
Perfluorooctanoic acid	PFOA	335-67-1
Perfluorononanoic acid	PFNA	375-95-1
Perfluorodecanoic acid	PFDA	335-76-2
Perfluoroundecanoic acid	PFUnA	2058-94-8
Perfluorododecanoic acid	PFDoA	307-55-1
Perfluorotridecanoic acid	PFTrDA	72629-94-8
Perfluoorotetradecanoic acid	PFTeDA	376-06-7
PERFLUOROALKYL SULFONIC ACIDS (PFASs)		
Perfluorobutanesulfonic acid	PFBS	375-73-5
Perfluoropentanesulfonic acid	PFPeS	2706-91-4
Perfluorohexanesulfonic acid	PFHxS	355-46-4
Perfluoroheptanesulfonic acid	PFHpS	375-92-8
Perfluorooctanesulfonic acid	PFOS	1763-23-1
Perfluorononanesulfonic acid	PFNS	68259-12-1

Perfluorodecanesulfonic acid	PFDS	335-77-3
Perfluorododecanesulfonic acid	PFDoS	79780-39-5
CHLORO-PERFLUOROALKYLSULFONATE		
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	11Cl-PF3OUdS	763051-92-9
Perfluoro(2-ethoxyethane)sulfonic acid	PFEESA	113507-82-7
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid	9Cl-PF3ONS	756426-58-1
FLUOROTELOMER CARBOXYLIC ACIDS		
3-Perfluoropropyl propanoic acid	3:3FTCA	356-02-5
2H,2H,3H,3H-Perfluorooctanoic acid	5:3FTCA	914637-49-3
Perfluoroheptyl propanoic acid	7:3FTCA	812-70-4
PERFLUOROOCTANESULFONAMIDES		
Perfluorooctanesulfonamide	PFOSA	754-91-6
N-methylperfluoro-1-octanesulfonamide	NMeFOSA	31506-32-8
N-ethylperfluoro-1-octanesulfonamide	NEtFOSA	4151-50-2
PERFLUOROCTANE SULFONAMIDE ETHANOLS		
N-Methyl perfluorooctanesulfonamidoethanol	NMeFOSE	24448-09-7
N-ethyl perfluorooctanesulfonamidoethanol	NEtFOSE	1691-99-2
TELOMER SULFONIC ACIDS		

1H,1H,2H,2H-perfluorohexanesulfonic acid (4:2)	4:2FTS	757124-72-4
1H,1H,2H,2H-perfluorooctanesulfonic acid (6:2)	6:2FTS	27619-97-2
1H,1H,2H,2H-perfluorodecanesulfonic acid (8:2)	8:2FTS	39108-34-4
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS		
N-methyl perfluorooctanesulfonamidoacetic acid	NMeFOSAA	2355-31-9
N-ethyl perfluorooctanesulfonamidoacetic acid	NEtFOSAA	2991-50-6
PERFLUOROETHER AND POLYETHER CARBOXYLIC ACIDS		
Perfluoro-3-methoxypropanoic acid	PFMPA	377-73-1
Perfluoro-4-methoxybutanoic acid	PFMBA	863090-89-5
Perfluoro(2-ethoxyethane)sulfonic acid	PFEESA	113507-82-7
Nonafluoro-3,6-dioxaheptanoic acid	NFDHA	151772-58-6

Table 2: Stock and Nominal Extracted Internal Standard Concentrations

Isotope Labeled Standard	Conc. of EIS Stock (ng/mL)	Nominal amount of EIS added to extracts (ng)
M4PFBA	2000	40
M5PFPeA	1000	20
M5PFHxA	500	10
M4PFHpA	500	10
M8PFOA	500	10
M9PFNA	250	5
M6PFDA	250	5
M7PFUdA	250	5
MPFDoA	250	5
M2PFTeDA	250	5
M3PFBS	466	9.32
M3PFHxS	474	9.48
M8PFOS	479	9.58
M2-4:2FTS	938	18.8

Isotope Labeled Standard	Conc. of EIS Stock (ng/mL)	Nominal amount of EIS added to extracts (ng)
M2-6:2FTS	951	19
M2-8:2FTS	960	19.2
M8FOSA	500	10
d3-N-MeFOSA	500	10
d5-N-EtFOSA	500	10
d3-N-MeFOSAA	1000	20
d5-N-EtFOSAA	1000	20
d7-N-MeFOSE	5000	100
d9-N-EtFOSE	5000	100
M3HFPO-DA	2000	40

Table 3: Stock and Nominal Non-Extracted Internal Standard Concentrations

Isotope Labeled Standard	Conc. of EIS Stock (ng/mL)	Nominal amount of EIS added to extracts (ng)
M3PFBA	1000	40
M2PFHxA	500	10
M4PFOA	500	10
M5PFNA	250	5
M2PFDA	250	5
18O2PFHxS	474	9.48
M4PFOS	479	9.58

Table 4: Initial Calibration levels and Concentrations

Analyte	Cal A	Cal B (LOQ)	CAL C	Cal D	Cal E (CCV)	Cal F	Cal G	Cal H	Cal I
PFBA	.4	.8	2	5	10	20	50	250	500
PFPeA	.2	.4	1	2.5	5	10	25	125	250
PFHxA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
PFHpA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
PFOA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
PFNA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
PFDA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
PFUnA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
PFDoA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
PFTrDA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
PFTA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
PFBS	0.089	0.177	0.444	1.11	2.22	4.44	11.1	55.4	111
PFPeS	0.094	0.188	0.471	1.18	2.35	4.71	11.8	58.8	118

PFHxS	0.091	0.183	0.457	1.14	2.29	4.57	11.4	57.1	114
PFHpS	0.095	0.191	0.477	1.19	2.38	4.77	11.9	59.6	119
PFOS	0.093	0.186	0.464	1.16	2.32	4.64	11.6	58	116
PFNS	0.096	0.192	0.481	1.20	2.41	4.81	12	60.1	120
PFDS	0.097	0.193	0.483	1.21	2.41	4.83	12.1	60.3	121
PFDOS	0.097	0.194	0.485	1.21	2.43	4.85	12.1	60.6	121.
4:2FTS	0.375	0.75	1.88	4.69	9.38	18.8	46.9	234	469
6:2FTS	0.38	0.76	1.9	4.75	9.5	19	47.5	238	475
8:2FTS	0.384	0.768	1.92	4.8	9.6	19.2	48	240	480
PFOSA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
NMeFOSA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
NEtFOSA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
NMeFOSAA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
NEtFOSAA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
NMeFOSE	1	2	5	12.5	25	50	125	625	1250
NEtFOSE	1	2	5	12.5	25	50	125	625	1250
HFPO-DA	.4	.8	2	5	10	20	50	250	500
ADONA	0.378	0.756	1.89	4.73	9.45	18.9	47.3	236	473
9Cl-PFONS	0.374	0.748	1.87	4.68	9.35	18.7	46.8	234	468
11Cl-PFOUdS	0.378	0.756	1.89	4.73	9.45	18.9	47.3	236	473
PFMPA	.2	.4	1	2.5	5	10	25	125	250
PFMBA	.2	.4	1	2.5	5	10	25	125	250
PFEESA	0.178	0.356	0.89	2.23	4.45	8.9	22.3	111	223
NFDHA	.2	.4	1	2.5	5	10	25	125	250
3:3FTCA	.5	1	2.5	6.25	12.5	25	62.5	312	624
5:3FTCA	2.5	5	12.5	31.3	62.5	125	312	1560	3120
7:3FTCA	2.5	5	12.5	31.3	62.5	125	312	1560	3125
M4PFBA	10	10	10	10	10	10	10	10	10
M5PFPeA	5	5	5	5	5	5	5	5	5
M5PFHxA	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
M4PFHpA	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
M8PFOA	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
M9PFNA	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
M6PFDA	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
M7PFUdA	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
MPFDoA	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25

M2PFTeDA	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
M3PFBS	2.33	2.33	2.33	2.33	2.33	2.33	2.33	2.33	2.33
M3PFHxS	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37
M8PFOS	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
M2-4:2FTS	4.69	4.69	4.69	4.69	4.69	4.69	4.69	4.69	4.69
M2-6:2FTS	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76
M2-8:2FTS	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
M8FOSA	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
d3-N-MeFOSA	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
d5-N-EtFOSA	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
d3-N-MeFOSAA	5	5	5	5	5	5	5	5	5
d5-N-EtFOSAA	5	5	5	5	5	5	5	5	5
d7-N-MeFOSE	25	25	25	25	25	25	25	25	25
d9-N-EtFOSE	25	25	25	25	25	25	25	25	25
M3HFPO-DA	10	10	10	10	10	10	10	10	10
M3PFBA	5	5	5	5	5	5	5	5	5
M2PFHxA	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
M4PFOA	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
M5PFNA	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
M2PFDA	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
18O2PFHxS	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37
M4PFOS	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4

Table 5: Expected Mass Transitions and instrument conditions.

Q1	Q2	Analyte	DP Volts	CE Volts
213.032	169.022	PFBA	-50	-14
263.039	219.03	PFPeA	-55	-12
263.039	68.9	PFPeA_2	-55	-55
313.047	269.037	PFHxA	-45	-12
313.047	119	PFHxA_2	-45	-28
363.055	319.045	PFHpA	-60	-12
363.055	169.022	PFHpA_2	-60	-24
413.063	369.053	PFOA	-65	-14
413.063	169.022	PFOA_2	-65	-23
463.071	419.061	PFNA	-70	-14
463.071	219.03	PFNA_2	-70	-24

513.078	469.069	PFDA	-80	-16
513.078	219.03	PFDA_2	-80	-30
563.086	519.076	PFUnA	-85	-18
563.086	269.037	PFUnA_2	-85	-25
613.094	569.084	PFDoA	-85	-18
613.094	319.045	PFDoA_2	-85	-28
663.102	619.092	PFTrDA	-85	-20
663.102	169.022	PFTrDA_2	-85	-36
713.11	669.1	PFTA	-70	-22
713.11	169.022	PFTA_2	-70	-38
299.092	80.062	PFBS	-100	-65
299.092	99.061	PFBS_2	-100	-40
349.1	80.062	PFPeS	-100	-75
349.1	99.061	PFPeS_2	-100	-60
399.107	80.062	PFHxS	-120	-75
399.107	99.061	PFHxS_2	-120	-80
449.115	80.062	PFHpS	-140	-95
449.115	99.061	PFHpS_2	-140	-80
499.113	80.062	PFOS	-145	-108
499.113	99.061	PFOS_2	-145	-85
549.131	80.062	PFNS	-180	-100
549.131	99.061	PFNS_2	-180	-100
599.139	80.062	PFDS	-170	-110
599.138	99.061	PFDS_2	-170	-100
699.154	80.062	PFDoS	-160	-150
699.154	99.061	PFDoS_2	-160	-130
327.146	307.139	4:2FTS	-100	-28
327.146	81.07	4:2FTS_2	-100	-50
427.161	407.155	6:2FTS	-120	-33
427.161	81.07	6:2FTS_2	-120	-65
527.177	507.17	8:2FTS	-140	-39
527.177	81.07	8:2FTS_2	-140	-85
498.146	78.07	FOSA	-150	-90
498.146	478	FOSA_2	-150	-35
512.163	219.03	NMeFOSA	-130	-35
512.163	169.022	NMeFOSA_2	-130	-40
526.192	219.03	NEtFOSA	-140	-35
526.192	169.022	NEtFOSA_2	-140	-35
570.202	419.061	NMeFOSAA	-100	-28

570.202	483	NMeFOSAA_2	-100	-22
584.229	419.061	NEtFOSAA	-100	-28
584.229	526.192	NEtFOSAA_2	-100	-38
616.1	58.9	NMeFOSE	-90	-70
630	58.9	NEtFOSE	-80	-75
285.035	169.022	HFPO-DA	-60	-12
285.035	184.9	HFPO-DA_2	-60	-18
377.06	251.028	ADONA	-65	-18
377.06	84.8	ADONA_2	-65	-48
530.8	351.05	9Cl-PFONS	-130	-38
532.8	353	9Cl-PFONS_2	-130	-38
630.9	451.031	11Cl-PFOUdS	-145	-41
632.9	452.9	11Cl-PFOUdS_2	-145	-41
241.085	177.069	3:3FTCA	-60	-12
241.085	117	3:3FTCA_2	-60	-50
341.101	237.072	5:3FTCA	-70	-20
341.101	217	5:3FTCA_2	-70	-35
441.117	316.9	7:3FTCA	-85	-30
441.117	337.088	7:3FTCA_2	-85	-20
315.093	135.013	PFEESA	-100	-35
315.093	82.9	PFEESA_2	-100	-25
229.032	85.006	PFMPA	-40	-25
279.042	85.006	PFMBA	-45	-25
295.032	201	NFDHA	-30	-15
295.032	84.9	NFDHA_2	-30	-40
217.001	171.999	MPFBA	-50	-14
268.001	222.999	M5PFPeA	-55	-12
318.009	273.007	M5PFHxA	-45	-12
367.024	322.022	M4PFHpA	-60	-12
421.002	376	M8PFOA	-65	-14
472.002	427	M9PFNA	-70	-14
519.033	474.03	M6PFDA	-80	-16
570.033	525.031	M7-PFUdA	-85	-18
615.079	570.033	MPFDoA	-85	-18
715.094	670.092	M2PFTeDA	-70	-22
302.069	80.062	M3PFBS	-100	-65
402.084	80.062	M3PFHxS	-120	-74
507.062	80.062	M8PFOS	-145	-85
329.13	81.07	M2-4:2FTS	-100	-50

429.162	81.07	M2-6:2FTS	-120	-65
529.162	81.07	M2-8:2FTS	-140	-85
506.077	78.07	M8FOSA	-150	-90
515.183	219.03	d3-NMeFOSA	-130	-35
531.222	219.03	d5-NEtFOSA	-140	-35
573.22	419.061	d3-NMeFOSAA	-75	-28
589.259	419.061	d5-NEtFOSAA	-90	-28
623.2	58.9	d7-NMeFOSE	-100	-28
639.2	58.9	d9-NEtFOSE	-100	-28
287.02	169.022	M3HFPO-DA	-60	-12
216.009	171.999	M3PFBA	-50	-14
315.032	270.03	M2PFHxA	-45	-12
417.032	372.03	M4PFOA	-65	-14
468.032	423.03	M5PFNA	-70	-14
515.063	470.061	M2PFDA	-80	-16
403.107	84.062	18O2-PFHxS	-120	-74
503.093	80.062	M4PFOS	-145	-85

Table 6: LC Method Conditions

Time (min)	2 mM Ammonium Acetate (5:95 CH/H_2O)	100% Acetonitrile	Gradient Curve
Initial	100.0	0.0	0
.2	100.0	0.0	2
4	70	30	7
7	45	55	8
9	25	80	8
10	5	95	6
10.4	98	2	10
11.8	100	0	7
12	100	0	1
Waters Aquity UPLC ® BEHC_{18} 2.1 x 50 mm packed with 1.7 µm BEH C_{18} stationary phase Flow rate of 0.4 mL/min 2 µL injection			

Table 7: ESI-MS Method Conditions

ESI Conditions	
Polarity	Negative ion
Curtain Gas	30
Collision gas	9
Ion Spray Voltage	-4500
Desolvation gas temp.	500 ºC
Ion Source Gas 1	30
Ion Source Gas 2	50
Entrance Poitential	-10
Exic Cell Potential	-11

Table 8. Reporting limits by Matrix

Compound	Aqueous (ng/L)	Solid (ng/g)	Tissue (ng/g)
PFBA	6.4	0.8	2
PFPeA	3.2	0.4	1
PFHxA	1.6	0.2	0.5
PFHpA	1.6	0.2	0.5
PFOA	1.6	0.2	0.5
PFNA	1.6	0.2	0.5
PFDA	1.6	0.2	0.5
PFUnA	1.6	0.2	0.5
PFDoA	1.6	0.2	0.5
PFTrDA	1.6	0.2	0.5
PFTA	1.6	0.2	0.5
PFBS	1.6	0.2	0.5
PFPeS	1.6	0.2	0.5
PFHxS	1.6	0.2	0.5
PFHpS	1.6	0.2	0.5
PFOS	1.6	0.2	0.5
PFNS	1.6	0.2	0.5
PFDS	1.6	0.2	0.5
PFDoS	1.6	0.2	0.5
4:2FTS	6.4	0.8	2
6:2FTS	6.4	0.8	2
8:2FTS	6.4	0.8	2
FOSA	1.6	0.2	2
NMeFOSA	1.6	0.2	0.5

NEtFOSA	1.6	0.2	0.5
NMeFOSAA	1.6	0.2	0.5
NEtFOSAA	1.6	0.2	0.5
NMeFOSE	16	2	5
NEtFOSE	16	2	5
HFPO-DA	6.4	0.8	2
ADONA	6.4	0.8	2
9Cl-PFONS	6.4	0.8	2
11Cl-PFOUdS	6.4	0.8	2
3:3FTCA	8	1	2.5
5:3FTCA	40	5	12.5
7:3FTCA	40	5	12.5
PFEESA	3.2	0.4	1
PFMPA	3.2	0.4	1
PFMBA	3.2	0.4	1
NFDHA	3.2	0.4	1

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Department of Environmental Conservation

SAMPLING, ANALYSIS, AND ASSESSMENT OF PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS)

Under NYSDEC's Part 375 Remedial Programs

April 2023

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ERRATA SHEET for

SAMPLING, ANALYSIS, AND ASSESSMENT OF PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) Under NYSDEC's Part 375 Remedial Programs Issued January 17, 2020

Citation and Page Number	Current Text	Corrected Text	Date
Title of Appendix I, page 32	Appendix H	Appendix I	2/25/2020
Document Cover, page 1	Guidelines for Sampling and Analysis of PFAS	Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs	9/15/2020
Data Assessment and Application to Site Cleanup Page 3	Until such time as Ambient Water Quality Standards (AWQS) and Soil Cleanup Objectives (SCOs) for PFOA and PFOS are published	Until such time as Soil Cleanup Objectives (SCOs) for PFOA and PFOS are published	3/28/2023
Water Sample Results Page 3	PFOA and PFOS should be further assessed and considered as potential contaminants of concern in groundwater or surface water if PFOA or PFOS is detected in any water sample at or above 10 ng/L (ppt) and is determined to be attributable to the site, either by a comparison of upgradient and downgradient levels, or the presence of soil source areas, as defined below.	NYSDEC has adopted ambient water quality guidance values for PFOA and PFOS. Groundwater samples should be compared to the human health criteria of 6.7 ng/l (ppt) for PFOA and 2.7 ng/l (ppt) for PFOS. These guidance values also include criteria for surface water for PFOS applicable for aquatic life, which may be applicable at some sites. Drinking water sample results should be compared to the NYS maximum contaminant level (MCL) of 10 ng/l (ppt).Analysis to determine if PFOA and PFOS concentrations are attributable to the site should include a comparison between upgradient and downgradient levels, and the presence of soil source areas, as defined below.	3/28/2023
Soil Sample Results Page 3	Soil cleanup objectives for PFOA and PFOS have been proposed in an upcoming revision to 6 NYCRR Part 375-6. Until SCOs are in effect, the following are to be used as guidance values:	NYSDEC will delay adding soil cleanup objectives for PFOA and PFOS to 6 NYCRR Part 375-6 until the PFAS rural soil background study has been completed. Until SCOs are in effect, the following are to be used as guidance values:	3/28/2023
Protection of Groundwater Page 3	PFOA (ppb) 1.1 PFOS (ppb) 3.7	PFOA (ppb) 0.8 PFOS (ppb) 1.0	3/28/2023

Citation and Page Number	Current Text	Corrected Text	Date
Footnote 2 Page 3	The movement of PFAS in the environment is being aggressively researched at this time; that research will eventually result in more accurate models for the behaviors of these chemicals. In the meantime, DEC has calculated the guidance value for the protection of groundwater using the same procedure used for all other chemicals, as described in Section 7.7 of the Technical Support Document (http://www.dec.ny.gov/docs/remediation_hudson_pdf/techsuppdoc.pdf).	The Protection of Groundwater values are based on the above referenced ambient groundwater guidance values. Details on that calculation are available in the following document, prepared for the February 2022 proposed changes to Part 375 (https://www.dec.ny.gov/docs/remediation_hudson_pdf/part375techsupport.pdf). The movement of PFAS in the environment is being aggressively researched at this time; that research will eventually result in more accurate models for the behaviors of these chemicals. In the meantime, DEC has calculated the guidance value for the protection of groundwater using the same procedure used for all other chemicals, as described in Section 7.7 of the Technical Support Document (http://www.dec.ny.gov/docs/remediation_hudson_pdf/techsuppdoc.pdf).	3/28/2023
Testing for Imported Soil Page 4	If the concentrations of PFOA and PFOS in leachate are at or above 10 ppt (the Maximum Contaminant Levels established for drinking water by the New York State Department of Health), then the soil is not acceptable.	If the concentrations of PFOA and PFOS in leachate are at or above the ambient water quality guidance values for groundwater, then the soil is not acceptable.	3/28/2023
Routine Analysis, page 9	"However, laboratories analyzing environmental samples…PFOA and PFOS in drinking water by EPA Method 537, 537.1 or ISO 25101."	"However, laboratories analyzing environmental samples…PFOA and PFOS in drinking water by EPA Method 537, 537.1, ISO 25101, or Method 533."	9/15/2020
Additional Analysis, page 9, new paragraph regarding soil parameters	None	"In cases where site-specific cleanup objectives for PFOA and PFOS are to be assessed, soil parameters, such as Total Organic Carbon (EPA Method 9060), soil pH (EPA Method 9045), clay content (percent), and cation exchange capacity (EPA Method 9081), should be included in the analysis to help evaluate factors affecting the leachability of PFAS in site soils."	9/15/2020

Citation and Page Number	Current Text	Corrected Text	Date
Data Assessment and Application to Site Cleanup Page 10	Until such time as Ambient Water Quality Standards (AWQS) and Soil Cleanup Objectives (SCOs) for PFAS are published, the extent of contaminated media potentially subject to remediation should be determined on a case-by-case basis using the procedures discussed below and the criteria in DER-10. Target levels for cleanup of PFAS in other media, including biota and sediment, have not yet been established by the DEC.	Until such time as Ambient Water Quality Standards (AWQS) and Soil Cleanup Objectives (SCOs) for PFOA and PFOS are published, the extent of contaminated media potentially subject to remediation should be determined on a case-by-case basis using the procedures discussed below and the criteria in DER-10. Preliminary target levels for cleanup of PFOA and PFOS in other media, including biota and sediment, have not yet been established by the DEC.	9/15/2020
Water Sample Results Page 10	PFAS should be further assessed and considered as a potential contaminant of concern in groundwater or surface water (…) If PFAS are identified as a contaminant of concern for a site, they should be assessed as part of the remedy selection process in accordance with Part 375 and DER-10.	PFOA and PFOS should be further assessed and considered as potential contaminants of concern in groundwater or surface water (…) If PFOA and/or PFOS are identified as contaminants of concern for a site, they should be assessed as part of the remedy selection process in accordance with Part 375 and DER-10.	9/15/2020

Citation and Page Number	Current Text	Corrected Text	Date
Soil Sample Results, page 10	"The extent of soil contamination for purposes of delineation and remedy selection should be determined by having certain soil samples tested by Synthetic Precipitation Leaching Procedure (SPLP) and the leachate analyzed for PFAS. Soil exhibiting SPLP results above 70 ppt for either PFOA or PFOS (individually or combined) are to be evaluated during the cleanup phase."	"Soil cleanup objectives for PFOA and PFOS will be proposed in an upcoming revision to 6 NYCRR Part 375-6. Until SCOs are in effect, the following are to be used as guidance values. " [Interim SCO Table] "PFOA and PFOS results for soil are to be compared against the guidance values listed above. These guidance values are to be used in determining whether PFOA and PFOS are contaminants of concern for the site and for determining remedial action objectives and cleanup requirements. Site-specific remedial objectives for protection of groundwater can also be presented for evaluation by DEC. Development of site-specific remedial objectives for protection of groundwater will require analysis of additional soil parameters relating to leachability. These additional analyses can include any or all the parameters listed above (soil pH, cation exchange capacity, etc.) and/or use of SPLP. As the understanding of PFAS transport improves, DEC welcomes proposals for site-specific remedial objectives for protection of groundwater. DEC will expect that those may be dependent on additional factors including soil pH, aqueous pH, % organic carbon, % Sand/Silt/Clay, soil cations: K, Ca, Mg, Na, Fe, Al, cation exchange capacity, and anion exchange capacity. Site-specific remedial objectives should also consider the dilution attenuation factor (DAF). The NJDEP publication on DAF can be used as a reference: https://www.nj.gov/dep/srp/guidance/rs/daf.pdf. "	9/15/2020

Citation and Page Number	Current Text	Corrected Text	Date
Testing for Imported Soil Page 11	Soil imported to a site for use in a soil cap, soil cover, or as backfill is to be tested for PFAS in general conformance with DER-10, Section 5.4(e) for the PFAS Analyte List (Appendix F) using the analytical procedures discussed below and the criteria in DER-10 associated with SVOCs. If PFOA or PFOS is detected in any sample at or above 1 µg/kg, then soil should be tested by SPLP and the leachate analyzed for PFAS. If the SPLP results exceed 10 ppt for either PFOA or PFOS (individually) then the source of backfill should be rejected, unless a site-specific exemption is provided by DER. SPLP leachate criteria is based on the Maximum Contaminant Levels proposed for drinking water by New York State's Department of Health, this value may be updated based on future Federal or State promulgated regulatory standards. Remedial parties have the option of analyzing samples concurrently for both PFAS in soil and in the SPLP leachate to minimize project delays. Category B deliverables should be submitted for backfill samples, though a DUSR is not required.	Testing for PFAS should be included any time a full TAL/TCL analyte list is required. Results for PFOA and PFOS should be compared to the applicable guidance values. If PFOA or PFOS is detected in any sample at or above the guidance values then the source of backfill should be rejected, unless a site-specific exemption is provided by DER based on SPLP testing, for example. If the concentrations of PFOA and PFOS in leachate are at or above 10 ppt (the Maximum Contaminant Levels established for drinking water by the New York State Department of Health), then the soil is not acceptable. PFOA, PFOS and 1,4-dioxane are all considered semi-volatile compounds, so composite samples are appropriate for these compounds when sampling in accordance with DER-10, Table 5.4(e)10. Category B deliverables should be submitted for backfill samples, though a DUSR is not required.	9/15/2020

Citation and Page Number	Current Text	Corrected Text	Date
Footnotes	None	[1] TOP Assay analysis of highly contaminated samples, such as those from an AFFF (aqueous film-forming foam) site, can result in incomplete oxidation of the samples and an underestimation of the total perfluoroalkyl substances. [2] The movement of PFAS in the environment is being aggressively researched at this time; that research will eventually result in more accurate models for the behaviors of these chemicals. In the meantime, DEC has calculated the soil cleanup objective for the protection of groundwater using the same procedure used for all other chemicals, as described in Section 7.7 of the Technical Support Document (http://www.dec.ny.gov/docs/remediation_hudson_pdf/techsuppdoc.pdf).	9/15/2020
Additional Analysis, page 9	In cases… soil parameters, such as Total Organic Carbon (EPA Method 9060), soil…	In cases… soil parameters, such as Total Organic Carbon (Lloyd Kahn), soil…	1/8/2021
Appendix A, General Guidelines, fourth bullet	List the ELAP-approved lab(s) to be used for analysis of samples	List the ELAP- certified lab(s) to be used for analysis of samples	1/8/2021
Appendix E, Laboratory Analysis and Containers	Drinking water samples collected using this protocol are intended to be analyzed for PFAS by ISO Method 25101.	Drinking water samples collected using this protocol are intended to be analyzed for PFAS by EPA Method 537, 537.1, 533, or ISO Method 25101	1/8/2021
Water Sample Results Page 9	"In addition, further assessment of water may be warranted if either of the following screening levels are met: a. any other individual PFAS (not PFOA or PFOS) is detected in water at or above 100 ng/L; or b. total concentration of PFAS (including PFOA and PFOS) is detected in water at or above 500 ng/L"	Deleted	6/15/2021

Citation and Page Number	Current Text	Corrected Text	Date
Routine Analysis, Page XX	Currently, New York State Department of Health's Environmental Laboratory Approval Program (ELAP)… criteria set forth in the DER's laboratory guidelines for PFAS in non-potable water and solids (Appendix H - Laboratory Guidelines for Analysis of PFAS in Non-Potable Water and Solids).	Deleted	5/31/2022
Analysis and Reporting, Page XX	As of October 2020, the United States Environmental Protection Agency (EPA) does not have a validated method for analysis of PFAS for media commonly analyzed under DER remedial programs (non-potable waters, solids). DER has developed the following guidelines to ensure consistency in analysis and reporting of PFAS.	Deleted	5/31/2022
Routine Analysis, Page XX	LC-MS/MS analysis for PFAS using methodologies based on EPA Method 537.1 is the procedure to use for environmental samples. Isotope dilution techniques should be utilized for the analysis of PFAS in all media.	EPA Method 1633 is the procedure to use for environmental samples.	
Soil Sample Results, Page XX	Soil cleanup objectives for PFOA and PFOS will be proposed in an upcoming revision to 6 NYCRR Part 375-6	Soil cleanup objectives for PFOA and PFOS have been proposed in an upcoming revision to 6 NYCRR Part 375-6	
Appendix A	"Include in the text… LC-MS/MS for PFAS using methodologies based on EPA Method 537.1"	"Include in the text ….EPA Method 1633"	
Appendix A	"Laboratory should have ELAP certification for PFOA and PFOS in drinking water by EPA Method 537, 537.1, EPA Method 533, or ISO 25101"	Deleted	
Appendix B	"Samples collected using this protocol are intended to be analyzed for PFAS using methodologies based on EPA Method 537.1"	"Samples collected using this protocol are intended to be analyzed for PFAS using EPA Method 1633"	

Citation and Page Number	Current Text	Corrected Text	Date
Appendix C	"Samples collected using this protocol are intended to be analyzed for PFAS using methodologies based on EPA Method 537.1"	"Samples collected using this protocol are intended to be analyzed for PFAS using EPA Method 1633"	
Appendix D	"Samples collected using this protocol are intended to be analyzed for PFAS using methodologies based on EPA Method 537.1"	"Samples collected using this protocol are intended to be analyzed for PFAS using EPA Method 1633"	
Appendix G		Updated to include all forty PFAS analytes in EPA Method 533	
Appendix H		Deleted	
Appendix I	Appendix I	Appendix H	
Appendix H	"These guidelines are intended to be used for the validation of PFAS analytical results for projects within the Division of Environmental Remediation (DER) as well as aid in the preparation of a data usability summary report."	"These guidelines are intended to be used for the validation of PFAS using EPA Method 1633 for projects within the Division of Environmental Remediation (DER)."	
Appendix H	"The holding time is 14 days…"	"The holding time is 28 days…"	
Appendix H, Initial Calibration	"The initial calibration should contain a minimum of five standards for linear fit…"	"The initial calibration should contain a minimum of six standards for linear fit…"	
Appendix H, Initial Calibration	Linear fit calibration curves should have an R^2 value greater than 0.990.	Deleted	
Appendix H, Initial Calibration Verification	Initial Calibration Verification Section	Deleted	
Appendix H	secondary Ion Monitoring Section	Deleted	
Appendix H	Branched and Linear Isomers Section	Deleted	

Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs

Objective

New York State Department of Environmental Conservation's Division of Environmental Remediation (DER) performs or oversees sampling of environmental media and subsequent analysis of PFAS as part of remedial programs implemented under 6 NYCRR Part 375. To ensure consistency in sampling, analysis, reporting, and assessment of PFAS, DER has developed this document which summarizes currently accepted procedures and updates previous DER technical guidance pertaining to PFAS.

Applicability

All work plans submitted to DEC pursuant to one of the remedial programs under Part 375 shall include PFAS sampling and analysis procedures that conform to the guidelines provided herein.

As part of a site investigation or remedial action compliance program, whenever samples of potentially affected media are collected and analyzed for the standard Target Analyte List/Target Compound List (TAL/TCL), PFAS analysis should also be performed. Potentially affected media can include soil, groundwater, surface water, and sediment. Based upon the potential for biota to be affected, biota sampling and analysis for PFAS may also be warranted as determined pursuant to a Fish and Wildlife Impact Analysis. Soil vapor sampling for PFAS is not required.

Field Sampling Procedures

DER-10 specifies technical guidance applicable to DER's remedial programs. Given the prevalence and use of PFAS, DER has developed "best management practices" specific to sampling for PFAS. As specified in DER-10 Chapter 2, quality assurance procedures are to be submitted with investigation work plans. Typically, these procedures are incorporated into a work plan, or submitted as a stand-alone document (e.g., a Quality Assurance Project Plan). Quality assurance guidelines for PFAS are listed in Appendix A - Quality Assurance Project Plan (QAPP) Guidelines for PFAS.

Field sampling for PFAS performed under DER remedial programs should follow the appropriate procedures outlined for soils, sediments, or other solids (Appendix B), non-potable groundwater (Appendix C), surface water (Appendix D), public or private water supply wells (Appendix E), and fish tissue (Appendix F).

QA/QC samples (e.g. duplicates, MS/MSD) should be collected as specified in DER-10, Section 2.3(c). For sampling equipment coming in contact with aqueous samples only, rinsate or equipment blanks should be collected. Equipment blanks should be collected at a minimum frequency of one per day per site or one per twenty samples, whichever is more frequent.

Analysis and Reporting

The investigation work plan should describe analysis and reporting procedures, including laboratory analytical procedures for the methods discussed below. As specified in DER-10 Section 2.2, laboratories should provide a full Category B deliverable. In addition, a Data Usability Summary Report (DUSR) should be prepared by an independent, third-party data validator. Electronic data submissions should meet the requirements provided at: https://www.dec.ny.gov/chemical/62440.html.

DER has developed a *PFAS Analyte List* (Appendix G) for remedial programs to understand the nature of contamination at sites. It is expected that reported results for PFAS will include, at a minimum, all the compounds listed. If lab and/or matrix specific issues are encountered for any analytes, the DER project manager, in consultation with the DER chemist, will make case-by-case decisions as to whether certain analytes may be temporarily or permanently discontinued from analysis at each site. As with other contaminants that are analyzed for at a site, the *PFAS Analyte List* may be refined for future sampling events based on investigative findings.

Routine Analysis

EPA Method 1633 is the procedure to use for environmental samples. Reporting limits for PFOA and PFOS in aqueous samples should not exceed 2 ng/L. Reporting limits for PFOA and PFOS in solid samples should not exceed 0.5 µg/kg. Reporting limits for all other PFAS in aqueous and solid media should be as close to these limits as possible. If laboratories indicate that they are not able to achieve these reporting limits for the entire *PFAS Analyte List*, site-specific decisions regarding acceptance of elevated reporting limits for specific PFAS can be made by the DER project manager in consultation with the DER chemist. Data review guidelines were developed by DER to ensure data comparability and usability (Appendix H - Data Review Guidelines for Analysis of PFAS in Non-Potable Water and Solids).

Additional Analysis

Additional laboratory methods for analysis of PFAS may be warranted at a site, such as the Synthetic Precipitation Leaching Procedure (SPLP) and Total Oxidizable Precursor Assay (TOP Assay).

In cases where site-specific cleanup objectives for PFOA and PFOS are to be assessed, soil parameters, such as Total Organic Carbon (Lloyd Kahn), soil pH (EPA Method 9045), clay content (percent), and cation exchange capacity (EPA Method 9081), should be included in the analysis to help evaluate factors affecting the leachability of PFAS in site soils.

SPLP is a technique used to determine the mobility of chemicals in liquids, soils and wastes, and may be useful in determining the need for addressing PFAS-containing material as part of the remedy. SPLP by EPA Method 1312 should be used unless otherwise specified by the DER project manager in consultation with the DER chemist.

Impacted materials can be made up of PFAS that are not analyzable by routine analytical methodology. A TOP Assay can be utilized to conceptualize the amount and type of oxidizable PFAS which could be liberated in the environment, which approximates the maximum concentration of perfluoroalkyl substances that could be generated if all polyfluoroalkyl substances were oxidized. For example, some polyfluoroalkyl substances may degrade or transform to form perfluoroalkyl substances (such as PFOA or PFOS), resulting in an increase in perfluoroalkyl substance concentrations as contaminated groundwater moves away from a source. The TOP Assay converts, through oxidation, polyfluoroalkyl substances (precursors) into perfluoroalkyl substances that can be detected by routine analytical methodology.[1]

[1] TOP Assay analysis of highly contaminated samples, such as those from an AFFF (aqueous film-forming foam) site, can result in incomplete oxidation of the samples and an underestimation of the total perfluoroalkyl substances.

Commercial laboratories have adopted methods which allow for the quantification of targeted PFAS in air and biota. The EPA's Office of Research and Development (ORD) is currently developing methods which allow for air emissions characterization of PFAS, including both targeted and non-targeted analysis of PFAS. Consult with the DER project manager and the DER chemist for assistance on analyzing biota/tissue and air samples.

Data Assessment and Application to Site Cleanup

Until such time as Soil Cleanup Objectives (SCOs) for PFOA and PFOS are published, the extent of contaminated media potentially subject to remediation should be determined on a case-by-case basis using the procedures discussed below and the criteria in DER-10. Preliminary target levels for cleanup of PFOA and PFOS in other media, including biota and sediment, have not yet been established by the DEC.

Water Sample Results

NYSDEC has adopted ambient water quality guidance values for PFOA and PFOS. Groundwater samples should be compared to the human health criteria of 6.7 ng/l (ppt) for PFOA and 2.7 ng/l (ppt) for PFOS. These human health criteria should also be applied to surface water that is used as a water supply. This guidance also includes criteria for surface water for PFOS applicable for aquatic life, which may be applicable at some sites. Drinking water sample results should be compared to the NYS maximum contaminant level (MCL) of 10 ng/l (ppt). Analysis to determine if PFOA and PFOS concentrations are attributable to the site should include a comparison between upgradient and downgradient levels, and the presence of soil source areas, as defined below.

If PFOA and/or PFOS are identified as contaminants of concern for a site, they should be assessed as part of the remedy selection process in accordance with Part 375 and DER-10.

Soil Sample Results

NYSDEC will delay adding soil cleanup objectives for PFOA and PFOS to 6 NYCRR Part 375-6 until the PFAS rural soil background study has been completed. Until SCOs are in effect, the following are to be used as guidance values:

Guidance Values for Anticipated Site Use	PFOA (ppb)	PFOS (ppb)
Unrestricted	0.66	0.88
Residential	6.6	8.8
Restricted Residential	33	44
Commercial	500	440
Industrial	600	440
Protection of Groundwater[2]	0.8	1.0

PFOA and PFOS results for soil are to be compared against the guidance values listed above. These guidance values are to be used in determining whether PFOA and PFOS are contaminants of concern for the site and for determining remedial action objectives and cleanup requirements. Site-specific remedial objectives for protection of groundwater can also be presented for evaluation by DEC. Development of site-specific remedial objectives for protection of groundwater will require analysis of additional soil parameters relating to leachability. These

[2] The Protection of Groundwater values are based on the above referenced ambient groundwater guidance values. Details on that calculation are available in the following document, prepared for the February 2022 proposed changes to Part 375 (https://www.dec.ny.gov/docs/remediation_hudson_pdf/part375techsupport.pdf). The movement of PFAS in the environment is being aggressively researched at this time; that research will eventually result in more accurate models for the behaviors of these chemicals. In the meantime, DEC has calculated the guidance value for the protection of groundwater using the same procedure used for all other chemicals, as described in Section 7.7 of the Technical Support Document (http://www.dec.ny.gov/docs/remediation_hudson_pdf/techsuppdoc.pdf).

additional analyses can include any or all the parameters listed above (soil pH, cation exchange capacity, etc.) and/or use of SPLP.

As the understanding of PFAS transport improves, DEC welcomes proposals for site-specific remedial objectives for protection of groundwater. DEC will expect that those may be dependent on additional factors including soil pH, aqueous pH, % organic carbon, % Sand/Silt/Clay, soil cations: K, Ca, Mg, Na, Fe, Al, cation exchange capacity, and anion exchange capacity. Site-specific remedial objectives should also consider the dilution attenuation factor (DAF). The NJDEP publication on DAF can be used as a reference: https://www.nj.gov/dep/srp/guidance/rs/daf.pdf.

Testing for Imported Soil

Testing for PFAS should be included any time a full TAL/TCL analyte list is required. Results for PFOA and PFOS should be compared to the applicable guidance values. If PFOA or PFOS is detected in any sample at or above the guidance values then the source of backfill should be rejected, unless a site-specific exemption is provided by DER based on SPLP testing, for example. If the concentrations of PFOA and PFOS in leachate are at or above the ambient water quality guidance values for groundwater, then the soil is not acceptable.

PFOA, PFOS and 1,4-dioxane are all considered semi-volatile compounds, so composite samples are appropriate for these compounds when sampling in accordance with DER-10, Table 5.4(e)10. Category B deliverables should be submitted for backfill samples, though a DUSR is not required.

Appendix A - Quality Assurance Project Plan (QAPP) Guidelines for PFAS

The following guidelines (general and PFAS-specific) can be used to assist with the development of a QAPP for projects within DER involving sampling and analysis of PFAS.

General Guidelines in Accordance with DER-10

- Document/work plan section title – Quality Assurance Project Plan
- Summarize project scope, goals, and objectives
- Provide project organization including names and resumes of the project manager, Quality Assurance Officer (QAO), field staff, and Data Validator
    - The QAO should not have another position on the project, such as project or task manager, that involves project productivity or profitability as a job performance criterion
- List the ELAP certified lab(s) to be used for analysis of samples
- Include a site map showing sample locations
- Provide detailed sampling procedures for each matrix
- Include Data Quality Usability Objectives
- List equipment decontamination procedures
- Include an "Analytical Methods/Quality Assurance Summary Table" specifying:
    - Matrix type
    - Number or frequency of samples to be collected per matrix
    - Number of field and trip blanks per matrix
    - Analytical parameters to be measured per matrix
    - Analytical methods to be used per matrix with minimum reporting limits
    - Number and type of matrix spike and matrix spike duplicate samples to be collected
    - Number and type of duplicate samples to be collected
    - Sample preservation to be used per analytical method and sample matrix
    - Sample container volume and type to be used per analytical method and sample matrix
    - Sample holding time to be used per analytical method and sample matrix
- Specify Category B laboratory data deliverables and preparation of a DUSR

Specific Guidelines for PFAS

- Include in the text that sampling for PFAS will take place
- Include in the text that PFAS will be analyzed by EPA Method 1633
- Include the list of PFAS compounds to be analyzed (*PFAS Analyte List*)
- Include the laboratory SOP for PFAS analysis
- List the minimum method-achievable Reporting Limits for PFAS
    - Reporting Limits should be less than or equal to:
        - Aqueous – 2 ng/L (ppt)
        - Solids – 0.5 µg/kg (ppb)
- Include the laboratory Method Detection Limits for the PFAS compounds to be analyzed
-
- Include detailed sampling procedures
    - Precautions to be taken
    - Pump and equipment types
    - Decontamination procedures
    - Approved materials only to be used
- Specify that regular ice only will be used for sample shipment
- Specify that equipment blanks should be collected at a minimum frequency of 1 per day per site for each matrix

Appendix B - Sampling Protocols for PFAS in Soils, Sediments and Solids

General

The objective of this protocol is to give general guidelines for the collection of soil, sediment and other solid samples for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Containers

Samples collected using this protocol are intended to be analyzed for PFAS using EPA Method 1633.

The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in to contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials including sample bottle cap liners with a PTFE layer.

A list of acceptable equipment is provided below, but other equipment may be considered appropriate based on sampling conditions.

- stainless steel spoon
- stainless steel bowl
- steel hand auger or shovel without any coatings

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification.

Sampling Techniques

Sampling is often conducted in areas where a vegetative turf has been established. In these cases, a pre-cleaned trowel or shovel should be used to carefully remove the turf so that it may be replaced at the conclusion of sampling. Surface soil samples (e.g. 0 to 6 inches below surface) should then be collected using a pre-cleaned, stainless steel spoon. Shallow subsurface soil samples (e.g. 6 to ~36 inches below surface) may be collected by digging a hole using a pre-cleaned hand auger or shovel. When the desired subsurface depth is reached, a pre-cleaned hand auger or spoon shall be used to obtain the sample.

When the sample is obtained, it should be deposited into a stainless steel bowl for mixing prior to filling the sample containers. The soil should be placed directly into the bowl and mixed thoroughly by rolling the material into the middle until the material is homogenized. At this point the material within the bowl can be placed into the laboratory provided container.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at 4 ± 2º Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- Request appropriate data deliverable (Category B) and an electronic data deliverable

Documentation

A soil log or sample log shall document the location of the sample/borehole, depth of the sample, sampling equipment, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate. Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appropriate rain gear (PVC, polyurethane, or rubber rain gear are acceptable), bug spray, and sunscreen should be used that does not contain PFAS. Well washed cotton coveralls may be used as an alternative to bug spray and/or sunscreen.

PPE that contains PFAS is acceptable when site conditions warrant additional protection for the samplers and no other materials can be used to be protective. Documentation of such use should be provided in the field notes.

Appendix C - Sampling Protocols for PFAS in Monitoring Wells

General

The objective of this protocol is to give general guidelines for the collection of groundwater samples for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Container

Samples collected using this protocol are intended to be analyzed for PFAS using EPA Method 1633.

The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include: stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials including plumbers tape and sample bottle cap liners with a PTFE layer.

A list of acceptable equipment is provided below, but other equipment may be considered appropriate based on sampling conditions.

- stainless steel inertia pump with HDPE tubing
- peristaltic pump equipped with HDPE tubing and silicone tubing
- stainless steel bailer with stainless steel ball
- bladder pump (identified as PFAS-free) with HDPE tubing

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification.

Sampling Techniques

Monitoring wells should be purged in accordance with the sampling procedure (standard/volume purge or low flow purge) identified in the site work plan, which will determine the appropriate time to collect the sample. If sampling using standard purge techniques, additional purging may be needed to reduce turbidity levels, so samples contain a limited amount of sediment within the sample containers. Sample containers that contain sediment may cause issues at the laboratory, which may result in elevated reporting limits and other issues during the sample preparation that can compromise data usability. Sampling personnel should don new nitrile gloves prior to sample collection due to the potential to contact PFAS containing items (not related to the sampling equipment) during the purging activities.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at 4 ± 2º Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- Collect one equipment blank per day per site and minimum 1 equipment blank per 20 samples. The equipment blank shall test the new and decontaminated sampling equipment utilized to obtain a sample for residual PFAS contamination. This sample is obtained by using laboratory provided PFAS-free water and passing the water over or through the sampling device and into laboratory provided sample containers
- Additional equipment blank samples may be collected to assess other equipment that is utilized at the monitoring well
- Request appropriate data deliverable (Category B) and an electronic data deliverable

Documentation

A purge log shall document the location of the sample, sampling equipment, groundwater parameters, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate. Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appropriate rain gear (PVC, polyurethane, or rubber rain gear are acceptable), bug spray, and sunscreen should be used that does not contain PFAS. Well washed cotton coveralls may be used as an alternative to bug spray and/or sunscreen.

PPE that contains PFAS is acceptable when site conditions warrant additional protection for the samplers and no other materials can be used to be protective. Documentation of such use should be provided in the field notes.

Appendix D - Sampling Protocols for PFAS in Surface Water

General

The objective of this protocol is to give general guidelines for the collection of surface water samples for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Container

Samples collected using this protocol are intended to be analyzed for PFAS using EPA Method 1633.

The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include: stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials including sample bottle cap liners with a PTFE layer.

A list of acceptable equipment is provided below, but other equipment may be considered appropriate based on sampling conditions.

- stainless steel cup

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification.

Sampling Techniques

Where conditions permit, (e.g. creek or pond) sampling devices (e.g. stainless steel cup) should be rinsed with site medium to be sampled prior to collection of the sample. At this point the sample can be collected and poured into the sample container.

If site conditions permit, samples can be collected directly into the laboratory container.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at 4 ± 2º Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- Collect one equipment blank per day per site and minimum 1 equipment blank per 20 samples. The equipment blank shall test the new and decontaminated sampling equipment utilized to obtain a sample for residual PFAS contamination. This sample is obtained by using laboratory provided PFAS-free water and passing the water over or through the sampling device and into laboratory provided sample containers
- Request appropriate data deliverable (Category B) and an electronic data deliverable

Documentation

A sample log shall document the location of the sample, sampling equipment, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate. Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appropriate rain gear (PVC, polyurethane, or rubber rain gear are acceptable), bug spray, and sunscreen should be used that does not contain PFAS. Well washed cotton coveralls may be used as an alternative to bug spray and/or sunscreen.

PPE that contains PFAS is acceptable when site conditions warrant additional protection for the samplers and no other materials can be used to be protective. Documentation of such use should be provided in the field notes.

Appendix E - Sampling Protocols for PFAS in Private Water Supply Wells

General

The objective of this protocol is to give general guidelines for the collection of water samples from private water supply wells (with a functioning pump) for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Container

Drinking water samples collected using this protocol are intended to be analyzed for PFAS by EPA Method 537, 537.1, 533, or ISO Method 25101. The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials (e.g. plumbers tape), including sample bottle cap liners with a PTFE layer.

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification.

Sampling Techniques

Locate and assess the pressure tank and determine if any filter units are present within the building. Establish the sample location as close to the well pump as possible, which is typically the spigot at the pressure tank. Ensure sampling equipment is kept clean during sampling as access to the pressure tank spigot, which is likely located close to the ground, may be obstructed and may hinder sample collection.

Prior to sampling, a faucet downstream of the pressure tank (e.g., washroom sink) should be run until the well pump comes on and a decrease in water temperature is noted which indicates that the water is coming from the well. If the homeowner is amenable, staff should run the water longer to purge the well (15+ minutes) to provide a sample representative of the water in the formation rather than standing water in the well and piping system including the pressure tank. At this point a new pair of nitrile gloves should be donned and the sample can be collected from the sample point at the pressure tank.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at 4 ± 2º Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- If equipment was used, collect one equipment blank per day per site and a minimum 1 equipment blank per 20 samples. The equipment blank shall test the new and decontaminated sampling equipment utilized to obtain a sample for residual PFAS contamination. This sample is obtained by using laboratory provided PFAS-free water and passing the water over or through the sampling device and into laboratory provided sample containers.
- A field reagent blank (FRB) should be collected at a rate of one per 20 samples. The lab will provide a FRB bottle containing PFAS free water and one empty FRB bottle. In the field, pour the water from the one bottle into the empty FRB bottle and label appropriately.
- Request appropriate data deliverable (Category B) and an electronic data deliverable
- For sampling events where multiple private wells (homes or sites) are to be sampled per day, it is acceptable to collect QC samples at a rate of one per 20 across multiple sites or days.

Documentation

A sample log shall document the location of the private well, sample point location, owner contact information, sampling equipment, purge duration, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate and available (e.g. well construction, pump type and location, yield, installation date). Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appendix F - Sampling Protocols for PFAS in Fish

This appendix contains a copy of the current SOP developed by the Division of Fish and Wildlife (DFW) entitled "General Fish Handling Procedures for Contaminant Analysis" (Ver. 8). This SOP should be followed when collecting fish for contaminant analysis. Note, however, that the Bureau of Ecosystem Health will not be supplying bags or tags. All supplies are the responsibility of the collector

Procedure Name: General Fish Handling Procedures for Contaminant Analysis

Number: FW-005

Purpose: This procedure describes data collection, fish processing and delivery of fish collected for contaminant monitoring. It contains the chain of custody and collection record forms that should be used for the collections.

Organization: Environmental Monitoring Section
Bureau of Ecosystem Health
Division of Fish and Wildlife (DFW)
New York State Department of Environmental Conservation (NYSDEC)
625 Broadway
Albany, New York 12233-4756

Version: 8

Previous Version Date: 21 March 2018

Summary of Changes to this Version: Updated bureau name to Bureau of Ecosystem Health. Added direction to list the names of all field crew on the collection record. Minor formatting changes on chain of custody and collection records.

Originator or Revised by: Wayne Richter, Jesse Becker

Date: 26 April 2019

Quality Assurance Officer and Approval Date: Jesse Becker, 26 April 2019

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

GENERAL FISH HANDLING PROCEDURES FOR CONTAMINANT ANALYSES

A. Original copies of all continuity of evidence (i.e., Chain of Custody) and collection record forms must accompany delivery of fish to the lab. A copy shall be directed to the Project Leader or as appropriate, Wayne Richter. All necessary forms will be supplied by the Bureau of Ecosystem Health. Because some samples may be used in legal cases, it is critical that each section is filled out completely. Each Chain of Custody form has three main sections:

   1. The top box is to be filled out **and signed** by the person responsible for the fish collection (e.g., crew leader, field biologist, researcher). This person is responsible for delivery of the samples to DEC facilities or personnel (e.g., regional office or biologist).

   2. The second section is to be filled out **and signed** by the person responsible for the collections while being stored at DEC, before delivery to the analytical lab. This may be the same person as in (1), but it is still required that they complete the section. Also important is the **range of identification numbers** (i.e., tag numbers) included in the sample batch.

   3. Finally, the bottom box is to record any transfers between DEC personnel and facilities. Each subsequent transfer should be **identified, signed, and dated**, until laboratory personnel take possession of the fish.

B. The following data are required on each **Fish Collection Record** form:

   1. Project and Site Name.

   2. DEC Region.

   3. All personnel (and affiliation) involved in the collection.

   4. Method of collection (gill net, hook and line, etc.)

   5. Preservation Method.

C. The following data are to be taken on each fish collected and recorded on the **Fish Collection Record** form:

   1. Tag number - Each specimen is to be individually jaw tagged at time of collection with a unique number. Make sure the tag is turned out so that the number can be read without opening the bag. Use tags in sequential order. For small fish or composite samples place the tag inside the bag with the samples. The Bureau of Ecosystem Health can supply the tags.

   2. Species identification (please be explicit enough to enable assigning genus and species). Group fish by species when processing.

   3. Date collected.

   4. Sample location (waterway and nearest prominent identifiable landmark).

   5. Total length (nearest mm or smallest sub-unit on measuring instrument) and weight (nearest g or

smallest sub-unit of weight on weighing instrument). Take all measures as soon as possible with calibrated, protected instruments (e.g. from wind and upsets) and prior to freezing.

6. Sex - fish may be cut enough to allow sexing or other internal investigation, but do not eviscerate. Make any incision on the right side of the belly flap or exactly down the midline so that a left-side fillet can be removed.

D. General data collection recommendations:

1. It is helpful to use an ID or tag number that will be unique. It is best to use metal striped bass or other uniquely numbered metal tags. If uniquely numbered tags are unavailable, values based on the region, water body and year are likely to be unique: for example, R7CAY11001 for Region 7, Cayuga Lake, 2011, fish 1. If the fish are just numbered 1 through 20, we have to give them new numbers for our database, making it more difficult to trace your fish to their analytical results and creating an additional possibility for errors.

2. Process and record fish of the same species sequentially. Recording mistakes are less likely when all fish from a species are processed together. Starting with the bigger fish species helps avoid missing an individual.

3. If using Bureau of Ecosystem Health supplied tags or other numbered tags, use tags in sequence so that fish are recorded with sequential Tag Numbers. This makes data entry and login at the lab and use of the data in the future easier and reduces keypunch errors.

4. Record length and weight as soon as possible after collection and before freezing. Other data are recorded in the field upon collection. An age determination of each fish is optional, but if done, it is recorded in the appropriate “Age” column.

5. For composite samples of small fish, record the number of fish in the composite in the Remarks column. Record the length and weight of each individual in a composite. All fish in a composite sample should be of the same species and members of a composite should be visually matched for size.

6. Please submit photocopies of topographic maps or good quality navigation charts indicating sampling locations. GPS coordinates can be entered in the Location column of the collection record form in addition to or instead for providing a map. These records are of immense help to us (and hopefully you) in providing documented location records which are not dependent on memory and/or the same collection crew. In addition, they may be helpful for contaminant source trackdown and remediation/control efforts of the Department.

7. When recording data on fish measurements, it will help to ensure correct data recording for the data recorder to call back the numbers to the person making the measurements.

E. Each fish is to be placed in its own individual plastic bag. For small fish to be analyzed as a composite, put all of the fish for one composite in the same bag but use a separate bag for each composite. It is important to individually bag the fish to avoid difficulties or cross contamination when processing the fish for chemical analysis. Be sure to include the fish’s tag number inside the bag, preferably attached to the fish with the tag number turned out so it can be read. Tie or otherwise secure the bag closed. **The Bureau of Ecosystem Health will supply the bags.** If necessary, food grade bags may be procured from a suitable vendor (e.g., grocery store). It is preferable to redundantly label each bag with a manila tag tied between the knot and the body of the bag. This tag should be labeled with the project name, collection location, tag number, collection date, and fish species. If scales are collected, the scale envelope should be labeled with

the same information.

F. Groups of fish, by species, are to be placed in one large plastic bag per sampling location. **The Bureau of Ecosystem Health will supply the larger bags.** Tie or otherwise secure the bag closed. Label the site bag with a manila tag tied between the knot and the body of the bag. The tag should contain: project, collection location, collection date, species and **tag number ranges**. Having this information on the manila tag enables lab staff to know what is in the bag without opening it.

G. Do not eviscerate, fillet or otherwise dissect the fish unless specifically asked to. If evisceration or dissection is specified, the fish must be cut along the exact midline or on the right side so that the left side fillet can be removed intact at the laboratory. If filleting is specified, the procedure for taking a standard fillet (SOP PREPLAB 4) must be followed, including removing scales.

H. Special procedures for PFAS: Unlike legacy contaminants such as PCBs, which are rarely found in day to day life, PFAS are widely used and frequently encountered. Practices that avoid sample contamination are therefore necessary. While no standard practices have been established for fish, procedures for water quality sampling can provide guidance. The following practices should be used for collections when fish are to be analyzed for PFAS:

No materials containing Teflon.
No Post-it notes.
No ice packs; only water ice or dry ice.
Any gloves worn must be powder free nitrile.
No Gore-Tex or similar materials (Gore-Tex is a PFC with PFOA used in its manufacture).
No stain repellent or waterproof treated clothing; these are likely to contain PFCs.
Avoid plastic materials, other than HDPE, including clipboards and waterproof notebooks.
Wash hands after handling any food containers or packages as these may contain PFCs.
Keep pre-wrapped food containers and wrappers isolated from fish handling.
Wear clothing washed at least six times since purchase.
Wear clothing washed without fabric softener.
Staff should avoid cosmetics, moisturizers, hand creams and similar products on the day of sampling as many of these products contain PFCs (Fujii et al. 2013). Sunscreen or insect repellent should not contain ingredients with “fluor” in their name. Apply any sunscreen or insect repellent well downwind from all materials. Hands must be washed after touching any of these products.

I. All fish must be kept at a temperature <45° F (<8° C) immediately following data processing. As soon as possible, freeze at -20° C ± 5° C. Due to occasional freezer failures, daily freezer temperature logs are required. The freezer should be locked or otherwise secured to maintain chain of custody.

J. In most cases, samples should be delivered to the Analytical Services Unit at the Hale Creek field station. Coordinate delivery with field station staff and send copies of the collection records, continuity of evidence forms and freezer temperature logs to the field station. For samples to be analyzed elsewhere, non-routine collections or other questions, contact Wayne Richter, Bureau of Ecosystem Health, NYSDEC, 625 Broadway, Albany, New York 12233-4756, 518-402-8974, or the project leader about sample transfer. Samples will then be directed to the analytical facility and personnel noted on specific project descriptions.

K. A recommended equipment list is at the end of this document.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF FISH AND WILDLIFE
FISH COLLECTION RECORD

Project and Site Name _____ DEC Region _____

Collections made by (include all crew) _____

Sampling Method: □Electrofishing □Gill netting □Trap netting □Trawling □Seining □Angling □Other _____

Preservation Method: □Freezing □Other _____ Notes (SWFDB survey number): _____

FOR LAB USE ONLY- LAB ENTRY NO.	COLLECTION OR TAG NO.	SPECIES	DATE TAKEN	LOCATION	AGE	SEX &/OR REPROD. CONDIT	LENGTH ( )	WEIGHT ( )	REMARKS

richter: revised 2011, 5/7/15, 10/4/16, 3/20/17; becker: 3/23/17, 4/26/19

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
CHAIN OF CUSTODY

I, _____, of _____ collected the
(Print Name) (Print Business Address)

following on _____, 20____ from _____
(Date) (Water Body)

in the vicinity of _____
(Landmark, Village, Road, etc.)

Town of _____, in _____ County.

Item(s) _____

_____

Said sample(s) were in my possession and handled according to standard procedures provided to me prior to collection. The sample(s) were placed in the custody of a representative of the New York State Department of Environmental Conservation on _____, 20_____.

_____ _____
Signature Date

I, _____, received the above mentioned sample(s) on the date specified and assigned identification number(s) _____ to the sample(s). I have recorded pertinent data for the sample(s) on the attached collection records. The sample(s) remained in my custody until subsequently transferred, prepared or shipped at times and on dates as attested to below.

_____ _____
Signature Date

SECOND RECIPIENT (Print Name)	TIME & DATE	PURPOSE OF TRANSFER
SIGNATURE	UNIT	
THIRD RECIPIENT (Print Name)	TIME & DATE	PURPOSE OF TRANSFER
SIGNATURE	UNIT	
FOURTH RECIPIENT (Print Name)	TIME & DATE	PURPOSE OF TRANSFER
SIGNATURE	UNIT	
RECEIVED IN LABORATORY BY (Print Name)	TIME & DATE	REMARKS
SIGNATURE	UNIT	
LOGGED IN BY (Print Name)	TIME & DATE	ACCESSION NUMBERS
SIGNATURE	UNIT	

richter: revised 21 April 2014; becker: 23 March 2017, 26 April, 2019

NOTICE OF WARRANTY

By signature to the chain of custody (reverse), the signatory warrants that the information provided is truthful and accurate to the best of his/her ability. The signatory affirms that he/she is willing to testify to those facts provided and the circumstances surrounding the same. Nothing in this warranty or chain of custody negates responsibility nor liability of the signatories for the truthfulness and accuracy of the statements provided.

HANDLING INSTRUCTIONS

On day of collection, collector(s) name(s), address(es), date, geographic location of capture (attach a copy of topographic map or navigation chart), species, number kept of each species, and description of capture vicinity (proper noun, if possible) along with name of Town and County must be indicated on reverse.

Retain organisms in manila tagged plastic bags to avoid mixing capture locations. Note appropriate information on each bag tag.

Keep samples as cool as possible. Put on ice if fish cannot be frozen within 12 hours. If fish are held more than 24 hours without freezing, they will not be retained or analyzed.

Initial recipient (either DEC or designated agent) of samples from collector(s) is responsible for obtaining and recording information on the collection record forms which will accompany the chain of custody. This person will seal the container using packing tape and writing his signature, the time and the date across the tape onto the container with indelible marker. Any time a seal is broken, for whatever purpose, the incident must be recorded on the Chain of Custody (reason, time, and date) in the purpose of transfer block. Container then is resealed using new tape and rewriting signature, with time and date.

EQUIPMENT LIST

Scale or balance of appropriate capacity for the fish to be collected.

Fish measuring board.

Plastic bags of an appropriate size for the fish to be collected and for site bags.

Individually numbered metal tags for fish.

Manila tags to label bags.

Small envelops, approximately 2” x 3.5”, if fish scales are to be collected.

Knife for removing scales.

Chain of custody and fish collection forms.

Clipboard.

Pens or markers.

Paper towels.

Dish soap and brush.

Bucket.

Cooler.

Ice.

Duct tape.

Appendix G – PFAS Analyte List

Group	Chemical Name	Abbreviation	CAS Number
Perfluoroalkyl sulfonic acids	Perfluorobutanesulfonic acid	PFBS	375-73-5
	Perfluoropentanesulfonic acid	PFPeS	2706-91-4
	Perfluorohexanesulfonic acid	PFHxS	355-46-4
	Perfluoroheptanesulfonic acid	PFHpS	375-92-8
	Perfluorooctanesulfonic acid	PFOS	1763-23-1
	Perfluorononanesulfonic acid	PFNS	68259-12-1
	Perfluorodecanesulfonic acid	PFDS	335-77-3
	Perfluorododecanesulfonic acid	PFDoS	79780-39-5
Perfluoroalkyl carboxylic acids	Perfluorobutanoic acid	PFBA	375-22-4
	Perfluoropentanoic acid	PFPeA	2706-90-3
	Perfluorohexanoic acid	PFHxA	307-24-4
	Perfluoroheptanoic acid	PFHpA	375-85-9
	Perfluorooctanoic acid	PFOA	335-67-1
	Perfluorononanoic acid	PFNA	375-95-1
	Perfluorodecanoic acid	PFDA	335-76-2
	Perfluoroundecanoic acid	PFUnA	2058-94-8
	Perfluorododecanoic acid	PFDoA	307-55-1
	Perfluorotridecanoic acid	PFTrDA	72629-94-8
	Perfluorotetradecanoic acid	PFTeDA	376-06-7
Per- and Polyfluoroether carboxylic acids	Hexafluoropropylene oxide dimer acid	HFPO-DA	13252-13-6
	4,8-Dioxa-3H-perfluorononanoic acid	ADONA	919005-14-4
	Perfluoro-3-methoxypropanoic acid	PFMPA	377-73-1
	Perfluoro-4-methoxybutanoic acid	PFMBA	863090-89-5
	Nonafluoro-3,6-dioxaheptanoic acid	NFDHA	151772-58-6
Fluorotelomer sulfonic acids	4:2 Fluorotelomer sulfonic acid	4:2-FTS	757124-72-4
	6:2 Fluorotelomer sulfonic acid	6:2-FTS	27619-97-2
	8:2 Fluorotelomer sulfonic acid	8:2-FTS	39108-34-4
Fluorotelomer carboxylic acids	3:3 Fluorotelomer carboxylic acid	3:3 FTCA	356-02-5
	5:3 Fluorotelomer carboxylic acid	5:3 FTCA	914637-49-3
	7:3 Fluorotelomer carboxylic acid	7:3 FTCA	812-70-4
Perfluorooctane sulfonamides	Perfluorooctane sulfonamide	PFOSA	754-91-6
	N-methylperfluorooctane sulfonamide	NMeFOSA	31506-32-8
	N-ethylperfluorooctane sulfonamide	NEtFOSA	4151-50-2
Perfluorooctane sulfonamidoacetic acids	N-methylperfluorooctane sulfonamidoacetic acid	N-MeFOSAA	2355-31-9
	N-ethylperfluorooctane sulfonamidoacetic acid	N-EtFOSAA	2991-50-6
Perfluorooctane sulfonamide ethanols	N-methylperfluorooctane sulfonamidoethanol	MeFOSE	24448-09-7
	N-ethylperfluorooctane sulfonamidoethanol	EtFOSE	1691-99-2

Group	Chemical Name	Abbreviation	CAS Number
Ether sulfonic acids	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (F-53B Major)	9Cl-PF3ONS	756426-58-1
	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (F-53B Minor)	11Cl-PF3OUdS	763051-92-9
	Perfluoro(2-ethoxyethane) sulfonic acid	PFEESA	113507-82-7

Appendix H - Data Review Guidelines for Analysis of PFAS in Non-Potable Water and Solids

General

These guidelines are intended to be used for the validation of PFAS using EPA Method 1633 for projects within the Division of Environmental Remediation (DER). Data reviewers should understand the methodology and techniques utilized in the analysis. Consultation with the end user of the data may be necessary to assist in determining data usability based on the data quality objectives in the Quality Assurance Project Plan. A familiarity with the laboratory's Standard Operating Procedure may also be needed to fully evaluate the data. If you have any questions, please contact DER's Quality Assurance Officer, Dana Barbarossa, at dana.barbarossa@dec.ny.gov.

Preservation and Holding Time

Samples should be preserved with ice to a temperature of less than 6°C upon arrival at the lab. The holding time is 28 days to extraction for aqueous and solid samples. The time from extraction to analysis for aqueous samples is 28 days and 40 days for solids.

Temperature greatly exceeds 6ºC upon arrival at the lab*	Use professional judgement to qualify detects and non-detects as estimated or rejected
Holding time exceeding 28 days to extraction	Use professional judgement to qualify detects and non-detects as estimated or rejected if holding time is grossly exceeded

*Samples that are delivered to the lab immediately after sampling may not meet the thermal preservation guidelines. Samples are considered acceptable if they arrive on ice or an attempt to chill the samples is observed.

Initial Calibration

The initial calibration should contain a minimum of six standards for linear fit and six standards for a quadratic fit. The relative standard deviation (RSD) for a quadratic fit calibration should be less than 20%.

The low-level calibration standard should be within 50% - 150% of the true value, and the mid-level calibration standard within 70% - 130% of the true value.

%RSD >20%	J flag detects and UJ non detects

Continuing Calibration Verification

Continuing calibration verification (CCV) checks should be analyzed at a frequency of one per ten field samples. If CCV recovery is very low, where detection of the analyte could be in question, ensure a low level CCV was analyzed and use to determine data quality.

CCV recovery <70 or >130%	J flag results

Blanks

There should be no detections in the method blanks above the reporting limits. Equipment blanks, field blanks, rinse blanks etc. should be evaluated in the same manner as method blanks. Use the most contaminated blank to evaluate the sample results.

Blank Result	Sample Result	Qualification
Any detection	<Reporting limit	Qualify as ND at reporting limit
Any detection	>Reporting Limit and >10x the blank result	No qualification
>Reporting limit	>Reporting limit and <10x blank result	J+ biased high

Field Duplicates

A blind field duplicate should be collected at rate of one per twenty samples. The relative percent difference (RPD) should be less than 30% for analyte concentrations greater than two times the reporting limit. Use the higher result for final reporting.

RPD >30%	Apply J qualifier to parent sample

Lab Control Spike

Lab control spikes should be analyzed with each extraction batch or one for every twenty samples. In the absence of lab derived criteria, use 70% - 130% recovery criteria to evaluate the data.

Recovery <70% or >130% (lab derived criteria can also be used)	Apply J qualifier to detects and UJ qualifier to non detects

Matrix Spike/Matrix Spike Duplicate

One matrix spike and matrix spike duplicate should be collected at a rate of one per twenty samples. Use professional judgement to reject results based on out of control MS/MSD recoveries.

Recovery <70% or >130% (lab derived criteria can also be used)	Apply J qualifier to detects and UJ qualifier to non detects of parent sample only
RPD >30%	Apply J qualifier to detects and UJ qualifier to non detects of parent sample only

Extracted Internal Standards (Isotope Dilution Analytes)

Problematic analytes (e.g. PFBA, PFPeA, fluorotelomer sulfonates) can have wider recoveries without qualification. Qualify corresponding native compounds with a J flag if outside of the range.

Recovery <50% or >150%	Apply J qualifier
Recovery <25% or >150% for poor responding analytes	Apply J qualifier
Isotope Dilution Analyte (IDA) Recovery <10%	Reject results

Signal to Noise Ratio

The signal to noise ratio for the quantifier ion should be at least 3:1. If the ratio is less than 3:1, the peak is discernable from the baseline noise and symmetrical, the result can be reported. If the peak appears to be baseline noise and/or the shape is irregular, qualify the result as tentatively identified.

Reporting Limits

If project-specific reporting limits were not met, please indicate that in the report along with the reason (e.g. over dilution, dilution for non-target analytes, high sediment in aqueous samples).

Peak Integrations

Target analyte peaks should be integrated properly and consistently when compared to standards. Ensure branched isomer peaks are included for PFAS where standards are available. Inconsistencies should be brought to the attention of the laboratory or identified in the data review summary report.

APPENDIX F

Community Air Monitoring Plan

Appendix 1A
New York State Department of Health
Generic Community Air Monitoring Plan

Overview

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or

overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

December 2009