

# ATLANTIC BROOKLYN PROJECT

BROOKLYN, NEW YORK

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## SITE MANAGEMENT PLAN

NYSDEC Site Number: C224305

**Prepared for:**

1065 Atlantic Avenue LLC  
7 Penn Plaza, Suite 600,  
New York, NY 10001

**Prepared by:**

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**Revisions to Final Approved Site Management Plan:**

Revision No.	Date Submitted	Summary of Revision	NYSDEC Approval Date

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**NOVEMBER 2024**

## CERTIFICATION STATEMENT

I Michael Scanlon, PE certify that I am currently a NYS registered professional engineer and that this Site Management Plan was prepared in accordance with applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10) and green remediation (DER-31).

MICHAEL SCANLON

NYS PE #103321

NOVEMBER 13, 2024



# ATLANTIC BROOKLYN PROJECT - BROOKLYN, NEW YORK 11238

## SITE MANAGEMENT PLAN

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## **List of Acronyms**

AS	Air Sparging
ASP	Analytical Services Protocol
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
BMP	Best Management Practice
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CAMP	Community Air Monitoring Plan
C/D	Construction and Demolition
CFR	Code of Federal Regulation
CLP	Contract Laboratory Program
COC	Certificate of Completion
CO2	Carbon Dioxide
CP	Commissioner Policy
DER	Division of Environmental Remediation
DUSR	Data Usability Summary Report
EC	Engineering Control
ECL	Environmental Conservation Law
ELAP	Environmental Laboratory Approval Program
ERP	Environmental Restoration Program
EWP	Excavation Work Plan
GHG	Greenhouse Gas
GWE&T	Groundwater Extraction and Treatment
HASP	Health and Safety Plan
IC	Institutional Control
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYCRR	New York Codes, Rules and Regulations
O&M	Operation and Maintenance
OM&M	Operation, Maintenance and Monitoring
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
P.E. or PE	Professional Engineer
PFAS	Per- and Polyfluoroalkyl Substances
PID	Photoionization Detector
PRP	Potentially Responsible Party
PRR	Periodic Review Report
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
QEP	Qualified Environmental Professional
RAO	Remedial Action Objective
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study

ROD	Record of Decision
RP	Remedial Party
RSO	Remedial System Optimization
SAC	State Assistance Contract
SCG	Standards, Criteria and Guidelines
SCO	Soil Cleanup Objective
SMP	Site Management Plan
SOP	Standard Operating Procedures
SOW	Statement of Work
SPDES	State Pollutant Discharge Elimination System
SSD	Sub-slab Depressurization
SVE	Soil Vapor Extraction
SVI	Soil Vapor Intrusion
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leachate Procedure
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VCA	Voluntary Cleanup Agreement
VCP	Voluntary Cleanup Program

**ES EXECUTIVE SUMMARY**

The following provides a brief summary of the controls implemented for the Site, as well as the inspections, monitoring, maintenance and reporting activities required by this Site Management Plan:

Site Identification	C224305 – Atlantic Brooklyn Project
Institutional Controls:	1. The property may be used for restricted residential, commercial, and industrial uses as defined in Part 375-1.8(g), subject to local zoning laws;
	2. ECs must be operated and maintained as specified in this SMP;
	3. The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDEC or the NYSDOH to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department;
	4. Environmental or public health monitoring must be performed as defined in this SMP;
	5. Data and information pertinent to Site management must be reported at the frequency and in a manner as defined in this SMP;
	6. Future activities that will disturb remaining contaminated material must be conducted in accordance with this SMP;
	7. Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in this SMP;
	8. Operation, maintenance, monitoring, inspection, and reporting of mechanical or physical component of the remedy shall be performed as defined in this SMP;
	9. Access to the Site must be provided to agents, employees, or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by the Environmental Easement;
	10. Vegetable gardens and farming on the Site are prohibited.
	11. ECs and ICs must be inspected at a frequency and in a manner defined in the SMP.

## Site Identification

## C224305 – Atlantic Brooklyn Project

	12. The Site owner must complete and submit to the NYSDEC a periodic certification of ECs and ICs in accordance with Part 375-1.8(h)3.
Engineering Controls:	1. Cover system (Track 4 portion of Site only)
	2. Sub-Slab Depressurization System (SSDS)
	3. Soil Vapor Extraction (SVE) System
Inspections:	Frequency
1. Cover inspection (Track 4 portion of Site only)	Annually
Monitoring:	
1. SVE System	Quarterly for 1 <sup>st</sup> year, then annually thereafter
2. VMP1 through VMP-9 for SSDS	Weekly / Monthly / Quarterly for 1st year, then annually thereafter
3. Soil Vapor Intrusion Evaluation for New Buildings	As needed
Maintenance:	
1. Site Cover Repairs (Track 4 portion of Site only)	As needed
2. SVE System and SSDS Blower maintenance	As needed
Reporting:	
2. Periodic Review Report (PRR)	16 months after the issuance of the COC, then annually thereafter

Further descriptions of the above requirements are provided in detail in the latter sections of this Site Management Plan.

## 1.0 INTRODUCTION

### 1.1 GENERAL

This Site Management Plan (SMP) is a required element of the remedial program for the Atlantic Brooklyn Project located at 1045-1065 Atlantic Avenue in Brooklyn, New York (hereinafter referred to as the “Site”). The Site is currently in the New York State (NYS) Brownfield Cleanup Program (BCP), Site No. C224305, which is administered by New York State Department of Environmental Conservation (NYSDEC or Department).

The original Remedial Parties, 1045 Atlantic, LLC and 1053 Atlantic LLC, entered into a Brownfield Cleanup Agreement (BCA) as Volunteers, on July 8, 2020 with the NYSDEC to remediate the Site. The BCA has since been updated five times:

- June 1, 2021, which expanded the size of the Site and added on a third Volunteer, 1063 Atlantic, LLC.
- June 1, 2022, which merged the Site lots together. With the merger, a new entity was created, Atlantic Brooklyn, LLC, and the deed was transferred from the three prior Volunteers to Atlantic Brooklyn, LLC.
- September 1, 2022, which added 1065 Atlantic Avenue LLC as a new Volunteer to the BCA.
- July 27, 2023, which transferred ownership of the Site to 1065 Atlantic Avenue LLC.
- September 15, 2023, which qualified the Site for tangible tax credits under the affordable housing gateway.

A figure showing the Site location is provided in **Figure 1** and the Site layout is provided in **Figure 2**. The boundaries of the Site are more fully described in the metes and bounds Site description that is part of the Environmental Easement provided in **Appendix A**.

After completion of the remedial work, some contamination was left at this Site, which is hereafter referred to as “remaining contamination.” Institutional and Engineering Controls (ICs and ECs) have been incorporated into the Site remedy to control exposure to

remaining contamination to ensure protection of public health and the environment. An Environmental Easement, granted to the NYSDEC and recorded with the Kings County Office of the City Register, requires compliance with this SMP and ECs and ICs placed on the Site.

This SMP was prepared to manage remaining contamination at the Site until the Environmental Easement is extinguished in accordance with ECL Article 71, Title 36. This plan has been approved by the NYSDEC and compliance with this plan is required by the grantor of the Environmental Easement and the grantor's successors and assigns. This SMP may only be revised with the approval of the NYSDEC.

It is important to note that:

- This SMP details the Site-specific implementation procedures that are required by the Environmental Easement. Failure to properly implement the SMP is a violation of the Environmental Easement, which is grounds for revocation of the Certificate of Completion (COC); and
- Failure to comply with this SMP is also a violation of Environmental Conservation Law, 6 NYCRR Part 375 and the BCA for the Site, and thereby subject to applicable penalties.

Reports associated with the Site can be viewed by contacting the NYSDEC or its successor agency managing environmental issues in New York State. A list of contacts for persons involved with the Site is provided in **Appendix B** of this SMP.

This SMP was prepared by PW Grosser Consulting Engineer and Hydrogeologist PC, (PWGC), on behalf of 1065 Atlantic Avenue LLC, in accordance with the requirements of the NYSDEC's DER-10 ("Technical Guidance for Site Investigation and Remediation"), dated May 3, 2010, and the guidelines provided by the NYSDEC. This SMP addresses the means for implementing the ICs and/or ECs that are required by the Environmental Easement for the Site.

## 1.2 REVISIONS AND ALTERATIONS

Revisions and alterations to this plan will be proposed in writing to the NYSDEC's project manager. The NYSDEC can also make changes to the SMP or request revisions from the remedial party. Revisions will be necessary upon, but not limited to, the following occurring: a change in media monitoring requirements, upgrades to or shutdown of a

remedial system, post-remedial removal of contaminated sediment or soil, or other significant change to the Site conditions. Approved alterations must conform with Article 145 Section 7209 of the Education Law regarding the application of professional seals and alterations. For example, changes to as-built drawings must be stamped by a New York State Professional Engineer. In accordance with the Environmental Easement for the Site, the NYSDEC project manager will provide a notice of approved changes to the SMP and append these notices to the SMP that is retained in its files.

### **1.3 NOTIFICATIONS**

Notifications will be submitted by the property owner to the NYSDEC, as needed, in accordance with NYSDEC's DER – 10 for the following reasons:

1. 60-day advance notice of proposed changes in Site use that are required under the terms of the BCA, 6 NYCRR Part 375 and/or Environmental Conservation Law.
2. 7-day advance notice of field activity associated with the remedial program.
3. 15-day advance notice of proposed ground-intrusive activity pursuant to the Excavation Work Plan. If the ground-intrusive activity qualifies as a change of use as defined in 6 NYCRR Part 375, the above mentioned 60-day advance notice is also required.
4. Notice within 48 hours of damage or defect to the foundation, structures or EC that reduces or has the potential to reduce the effectiveness of an EC, and likewise, action to be taken to mitigate the damage or defect.
5. Notice within 48 hours of non-routine maintenance activities.
6. Verbal notice by noon of the following day of an emergency, such as a fire; flood; or earthquake that reduces or has the potential to reduce the effectiveness of ECs in place at the Site, with written confirmation within 7 days that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.
7. Follow-up status reports on actions taken to respond to an emergency event requiring ongoing responsive action submitted to the NYSDEC within 45 days describing and documenting actions taken to restore the effectiveness of the ECs.

A change in the ownership of the Site or the responsibility for implementing this SMP will include the following notifications:

8. At least 60 days prior to the change, the NYSDEC will be notified in writing of the proposed change. This will include a certification that the prospective



purchaser/Remedial Party has been provided with a copy of the Brownfield Cleanup Agreement (BCA) and approved work plans and reports, including this SMP.

9. Within 15 days after the transfer of all or part of the Site, the new owner's name, contact representative, and contact information will be confirmed in writing to the NYSDEC.

**Table 1** on the following page includes contact information for the above notifications. The information on this table will be updated as necessary to provide accurate contact information. A full listing of Site-related contact information is provided in **Appendix B**.

**Table 1: Notifications\***

<b><u>Name</u></b>	<b><u>Contact Information</u></b>	<b><u>Required Notification**</u></b>
Jennifer Gonzalez NYSDEC Project Manager	(718) 482-4508 jennifer.gonzalez@dec.ny.gov	Notifications 1 through 9
Andre Obligado, PG NYSDEC Region 2 Section Chief	(718) 482-6412 andre.obligado@dec.ny.gov	Notifications 1 through 9
Kelly Lewandowski, NYSDEC Site Control Section Chief	Kelly.lewandowski@dec.ny.gov	Notifications 1 and 8
James Sullivan NYSDOH Project Manager	(518) 402-5584 Jim.Sullivan@health.ny.gov	Notifications 4, 6, and 7

\* Note: Notifications are subject to change and will be updated as necessary.

\*\* Note: Numbers in this column reference the numbered bullets in the notification list in this section.

## 2.0 SUMMARY OF PREVIOUS INVESTIGATIONS AND REMEDIAL ACTIONS

### 2.1 SITE LOCATION AND DESCRIPTION

The Site is located in Brooklyn, Kings County, New York and was formerly identified as Block 2020 and Lots 68, 73, 74 and 77 on the New York City Tax Map (the lots have since been merged into a single lot, Lot 68) (see **Figure 2**). The Site is an approximately 1.0814-acre area and is bounded by residential properties to the north, Atlantic Avenue to the south, an elevated railroad to the east, and commercial and industrial properties to the west. The boundaries of the Site are more fully described in **Appendix A** – Environmental Easement. The owner and operator of the Site parcels at the time of issuance of this SMP is:

1065 Atlantic Avenue LLC  
7 Penn Plaza, Suite 600,  
New York, NY 10001

### 2.2 PHYSICAL SETTING

#### 2.2.1 *Land Use*

The Site is the future location of a new 17-story mixed-use building with a partial cellar. The Site is zoned for residential and commercial uses and is currently under construction. There are no current Site occupants.

The properties adjoining the Site and in the neighborhood surrounding the Site primarily include commercial, residential, and industrial properties. The properties immediately south, west, and east of the Site include commercial and industrial properties and the properties immediately north of the Site include residential properties.

#### 2.2.2 *Geology and Hydrogeology*

The stratigraphy of the Site, as reviewed from soil borings conducted by PWGC and by Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology D.P.C. (Langan), and as encountered during the Site remediation, shows that sandy, silty material with fragments of brick, concrete, cinder, etc. (“fill”) material was present from grade ranging down to approximately 4 to 6 feet below grade on the western side of the Site and down to approximately 5 to 9 feet on the eastern side. Underlying the

fill are native soils which were mostly poorly graded, with alternating layers of fine to medium grained sands and medium to coarse grained sands with occasional layers of gravel around the 30-to-40-foot intervals.

The elevation of the Site is approximately 82 feet above mean sea level. The groundwater table was encountered at approximately 70 to 73 feet below grade surface. Groundwater flow direction generally flows to the northwest at a relatively flat gradient. Bedrock is estimated to be 100 feet below grade.

A geologic cross section of the site including the remedial and development related excavation is included as **Appendix C** and a groundwater contour map is included as **Figure 3**.

## 2.3 INVESTIGATION AND REMEDIAL HISTORY

The following narrative provides an investigation and remedial history timeline and a brief summary of the available project records to document key investigative and remedial milestones for the Site. Full titles for each of the reports referenced below are provided in Section 8.0 - References.

### 2.3.1 1045 Atlantic Avenue (Former Lot 77)

#### 2.3.1.1 Phase I Environmental Site Assessment (May 2004)

General Consolidated Industries, Inc. (GCI) issued a Phase I ESA for the subject Site on August 20, 2014. This Phase I Report references an earlier Phase I from May 2004. A copy of this report was not supplied to PWGC. According to information included in the 2014 Phase I, the recognized environmental conditions (RECs) from May 2004 included:

- Dye testing on the interior and exterior discharge points.
- The oil water separator (OWS) specifications should be reviewed and the OWS and associated drains should be properly sealed and abandoned.
- The former repair pit should be inspected and a soil boring should be installed.
- Waste manifests for the waste oil produced by the Site should be inspected.
- Exterior storage drums should be moved indoors or properly disposed of.
- Stained areas at the exterior diesel storage tank should be cleaned.
- A geophysical investigation should be conducted.

- A subsurface investigation should be conducted within the vicinity of the gasoline tanks as depicted on the Sanborn maps.
- Proper permitting of the onsite aboveground storage tanks (ASTs).
- Asbestos-containing materials should be abated and/or an Operations and Maintenance Program should be implemented.
- The open violations should be rectified.

#### 2.3.1.2 Phase II Environmental Site Assessment (August 2004)

GCI issued a Phase II ESA in August 2004. The RECs from the May 2004 Phase I ESA were more succinctly summarized as:

- There was a concern that the sinks and/or drains may discharge to an onsite underground injection control (UIC) structure.
- Based on historical usage, there was a concern that undocumented underground storage tanks (USTs) may be present.
- There was a concern that historical usage may have impacted subsurface soils and/or groundwater.
- The Phase II included:
  - Dye tests which confirmed that the interior and exterior drains, sinks, and sump pit are connected to the New York City Sewer System.
  - A geophysical investigation was conducted which identified a 1,000-gallon UST along the northwest side of the industrial building and no magnetic anomaly was identified along the northeast side of the same building which corresponded to a historic location of a gasoline tank on the Sanborn maps.
  - Soil borings were installed in the former repair pit, near the 1,000-gallon UST in the northwest, and in the northeast area where a gasoline tank was identified on the Sanborn maps. The soil results indicated that volatile organic compounds (VOCs), semi volatile organic compounds (SVOCs), and metals met their respective NYSDEC Recommended Soil Cleanup Objectives (SCOs). One SVOC was slightly elevated which was stated to be ‘due to Site background conditions and is not considered a significant threat to human health.’

#### 2.3.1.3 Tank Abandonment Report (January 2005)

GCI issued a Tank Abandonment Report on January 24, 2005 for a tank abandonment that occurred at the subject Site on December 22, 2004. A 1,000-gallon gasoline/diesel fuel UST was abandoned in place with foam, northwest of the industrial

building, with piping and vent lines cut and removed. No further action was recommended by GCI. This appears to be the UST identified in the Phase II geophysical survey.

#### 2.3.1.4 Phase I Environmental Site Assessment Report (August 2014)

The Phase I conducted in August 2014 by GCI identified one REC: there was a significant amount of staining around an exterior diesel tank, and it was recommended that the area be power washed.

#### 2.3.1.5 Phase I Environmental Site Assessment Report (March 2019)

PWGC conducted a Phase I ESA for 1045 Atlantic Avenue in March 2019. Conditions determined to be RECs are detailed below:

- The Site appeared to have been historically used for industrial purposes. Historical usage of the Site included manufacturing, auto repair, and petroleum delivery services. Operations at the time included the storage and use of hazardous substances and petroleum products at the Site. An OWS had historically been utilized at the Site which had the potential to leak. No information had been provided regarding sampling of soils below or adjacent to the OWS. The OWS was reportedly out of service but had not been properly abandoned. Identified historical usages are likely to have used/stored hazardous substances and/or petroleum products at the Site, as well.
- The subject Site was listed as a petroleum bulk storage (PBS) site for one 3,000-gallon No. 2 Fuel oil AST located on the subject Site. The tank was located in a subterranean vault with limited access for inspections. No violations or spills were associated with this tank. There were four additional ASTs that were identified during the Site inspection, including one 275-gallon active diesel AST, one 275-gallon active waste oil AST, and two 275-gallon empty inactive ASTs. A significant amount of oil staining was observed at the exterior diesel oil AST believed to be the result of poor dispensing practices. A recommendation was made in a Phase I ESA prepared by GCI in August 2014 to steam clean this area; however, since concrete is porous and significant staining was observed, sampling of the soil beneath the slab to determine if the subsurface has been impacted was warranted.
- The subject Site was listed as a PBS, ERNS, and RCRA Non-Generator site. No violations or other issues were identified in the database report with respect to these listings; however, the Site inspection did identify issues related to onsite petroleum storage and poor housekeeping practices which is a concern related to historical storage of chemicals.

#### 2.3.1.6 Phase II Environmental Site Assessment Report (April 2019)

PWGC conducted an initial Phase II investigation for the subject Site on March 22, 2019. Based on the results of the initial investigation, a follow-up investigation occurred on April 9, 2019. The investigations were conducted to determine if historical industrial use, poor housekeeping practices, and the presence of the inspection pit, drum storage, diesel tank, waste oil tank, and/or OWS have impacted the subsurface of the subject Site.

During the initial investigation, eight soil samples were collected from the 0 to 2 foot or the 4 to 6 foot intervals and three sub-slab soil vapor samples were collected. The follow-up investigation included six additional soil boring locations with soil samples collected from the 10 to 12 foot, the 12 to 14 foot, and/or the 18 to 20 foot intervals and two groundwater samples collected, one from the approximate upgradient location and one from the approximate downgradient location.

Results of the initial soil and soil vapor investigations indicated that chlorinated volatile organic compounds (VOCs), including trichloroethene (TCE), were present in excess of their Unrestricted and/or Restricted Residential soil cleanup objectives (SCOs). Follow-up investigation confirmed that TCE is also present in the groundwater which was detected at approximately 75 feet below grade. Low levels of TCE were also present in the soil samples collected from the deeper intervals.

During the initial investigation, SVOCs were detected at concentrations that exceeded the Unrestricted and/or Restricted Residential SCOs. The follow up investigation indicated that SVOC impacts were not present in the deeper intervals. The presence of SVOCs in the shallow interval appears to be related to the presence of fill ranging from grade to 2 to 7 feet intervals and not petroleum contamination as there was no visual or olfactory evidence of petroleum impact in these borings.

Metal impacts of lead, mercury, cadmium, and chromium which exceed their Unrestricted and/or Restricted Residential SCOs were observed in the shallow and deeper intervals in much of the soil borings. The highest detection of chromium was in SB007 (4 to 6 feet) at 7,960 mg/kg. SB011 is a step out boring, that is in almost the same location as SB007, but deeper (10 to 12 feet), and chromium at this location was 687 mg/kg. The step-out borings SB012 and SB010 contained chromium concentrations less than 700

mg/kg at 4 to 6 feet and 10 to 12 feet. The source of the metal impacts was likely due to historic usage of the subject Site.

Soil vapor samples collected from the Site were analyzed for VOCs. Elevated concentrations included:

- Chloroform ranged from non-detect to 7.23  $\mu\text{g}/\text{m}^3$  (SS-002); and,
- TCE ranged from 193  $\mu\text{g}/\text{m}^3$  to 774  $\mu\text{g}/\text{m}^3$  (SS-001, SS-002, and SS-003).

The sub-slab concentration of TCE in the sub-slab soil vapor, in addition to its presence in the soil and groundwater, also indicates that mitigation may be warranted.

### 2.3.2 1053, 1057, 1059 and 1065 Atlantic Avenue (Former Lots 74, 73, 68)

#### 2.3.2.1 Phase II Environmental Site Assessment Report (March 2016)

PWGC was provided a copy of a Limited Phase II ESA dated March 2016 prepared by Associated Environmental Services, Ltd for the Site located at 1065 Atlantic Avenue. PWGC's review of the Phase II ESA revealed that five soil borings were conducted at the Site and samples were collected from 5 to 8 feet in each boring. The samples were analyzed for VOCs, SVOCs, and RCRA metals. VOCs were not detected at concentrations exceeding detection limits in each sample, SVOCs were not detected at concentrations exceeding detection limits in four samples with minor detections in the fifth sample that did not exceed NYSDEC Part 375 Unrestricted Use SCOs, and metals were detected in each sample at concentrations less than Unrestricted Use SCOs.

#### 2.3.2.2 Phase I Environmental Site Assessment Report (April 2019)

PWGC conducted a Phase I ESA in April 2019. PWGC identified the following RECs for the subject Site:

- The 1053, 1057, 1059, and 1065 Atlantic Sites appeared to have been historically used for auto repair/painting facilities, with 1065 Atlantic still being utilized as an auto repair facility until the present day. Operations at the time of the inspection included the storage and use of hazardous substances and petroleum products at the 1065 Atlantic Site. Identified historical usages are likely to have used/stored hazardous substances and/or petroleum products at the Sites, as well.
- Five single piston underground hydraulic lifts were identified within the auto repair facility at the 1065 Atlantic Avenue Site. Three of these lifts were still in use at the time of the inspection and two of the lifts are out of service. The



subsurface structures affiliated with hydraulic lifts had the potential to leak. The condition of the subsurface structures of the lifts could not be verified. The two out of service lifts did not appear to have undergone proper abandonment.

- Two 275-gallon heating oil ASTs were identified in the basement of the 1065 Atlantic Avenue Site. The ASTs appeared to have no evidence of leaking or a release, other than minor corrosion to the tank bodies. Both tanks resided on an intact concrete slab with minimal evidence of staining; however, the two ASTs were connected via approximately six feet of underground fill line which fills the one AST from the other. The fill line ran through the subsurface soil under the building and had the potential to leak. The condition of the fill line could not be verified during the Site inspection.

#### 2.3.2.3 Phase II Environmental Site Assessment Report (September 2019)

PWGC conducted a Phase II investigation for the subject Site on April 10, 2019. The investigation was conducted to determine if historic industrial use, the presence of an underground fuel oil line connected to the ASTs, or the presence of hydraulic lifts had impacted the subsurface of the subject Site.

During the investigation, a geophysical survey was conducted, seven soil borings were installed, five soil samples were analyzed, two sub-slab soil vapor samples were analyzed, and one soil vapor sample was analyzed. Based on the results of the geophysical survey, it did not appear that anomalies consistent with USTs were present on the subject Site.

Results of the soil investigation indicated that VOCs, including TCE (max concentration of 19 mg/kg) and naphthalene (max concentration of 320 mg/kg), were present on the Site in concentrations that exceed their respective Unrestricted Use and Protection of Groundwater SCOs in the soil. The soil vapor investigation also identified TCE (max concentration of 386  $\mu\text{g}/\text{m}^3$ ) and PCE (max concentration of 492  $\mu\text{g}/\text{m}^3$ ) at concentrations exceeding USEPA VISLs. The sub-slab concentration of TCE observed indicated that mitigation was required, as per the NYSDOH matrices. Based on this information, PWGC concluded that there was CVOC impact (mainly TCE) at the subject Site that appeared to be related to historic on-site activities.

SVOCs were detected at concentrations that exceeded the Unrestricted Use, Restricted Residential, and/or Commercial Use SCOs in soils. The highest total SVOC

concentration detected was 2,897 mg/kg and corresponded to the same boring that contained naphthalene, SB018.

Metals at concentrations exceeding Unrestricted and/or Restricted Residential SCOs were not detected except for lead (max concentration of 390 mg/kg) and mercury (max concentration of 1.71 mg/kg).

The boring conducted adjacent to the underground fill line did not reveal evidence of impact relating to the presence of the fill line. In addition, the boring conducted adjacent to the hydraulic lift area did not reveal evidence of impact relating to the presence of the hydraulic lifts.

### 2.3.3 *1061 to 1063 Atlantic Ave (Former Lot 70)*

#### 2.3.3.1 Phase I Environmental Site Assessment Report (September 2020)

PWGC conducted a Phase I ESA for 1061 to 1063 Atlantic Avenue in August 2020. Conditions determined to be RECs are detailed below:

- The subject Site appeared to have been historically used for light industrial purposes, including auto repair / brake shops, a coal / fuel oil company, and a contracting / maintenance facility, since at least 1928. These types of historical property usages are likely to have utilized and stored both hazardous substances and petroleum products. Based on this information, the long-standing historical usage of the Site for industrial purposes represented a REC.
- FDNY tank records were acquired via a FOIL request which identified that two 275-gallon #2 fuel oil tanks were located at 1061 Atlantic Avenue. The tanks were noted as being on floor “0,” which PWGC believed was the ground floor; the location of the tanks themselves (aboveground or underground) were not identified. The records were established in 1984 and last inspected in 1986. No NYSDEC PBS registration was identified for the Site and no evidence of tanks was identified during the Site reconnaissance inspection. However, out of service oil tanks can present a source of a release of petroleum products and no documentation was provided as to whether the tanks were appropriately abandoned and / or disposed of. Based on this information, PWGC believed that the historical fuel oil tanks represented a REC.

#### 2.3.3.2 Phase II Environmental Site Assessment Report (September 2020)

PWGC conducted a Phase II investigation for the Site on September 1 and 3, 2020. During the investigation, a geophysical survey was conducted, ten soil borings were installed, nine soil samples were analyzed, two sub-slab soil vapor samples were analyzed,

and two soil vapor samples were analyzed. ASTs and USTs were not observed at the Site; however, evidence of former tank storage (a gauge and piping) was observed in a partial basement that was not accessible during the Phase I ESA. Although a UST was not detected during the geophysical survey, the survey's depth and effectiveness was limited due to the presence of reinforced concrete and metallic debris.

Results of the investigation included:

- VOCs detected included petroleum-related compounds and chlorinated solvents. VOCs in soil included petroleum-related compounds that exceeded Unrestricted Use SCOs but did not exceed Restricted Residential SCOs. Chlorinated compounds were not detected in soil except for one soil sample which contained TCE at a concentration less than Unrestricted Use SCOs. VOCs were also detected in the sub-slab and soil vapor samples. The highest detection of TCE was identified in a sub-slab soil vapor sample with a maximum concentration of 2,500  $\mu\text{g}/\text{m}^3$ . Several petroleum compounds were also identified, including benzene, toluene, ethylbenzene, and xylene (BTEX) with a maximum BTEX concentration of 10,547  $\mu\text{g}/\text{m}^3$ .
- SVOCs were detected at concentrations that exceeded the Unrestricted Use, Restricted Residential, and/or Commercial Use SCOs in soils generally corresponding to the depths that fill was observed. The highest total SVOC concentration detected was 164 mg/kg.
- Metals at concentrations exceeding Unrestricted and/or Restricted Residential SCOs were not detected except for lead (max concentration of 133 mg/kg) and mercury (max concentration of 0.555 mg/kg).

#### 2.3.4 Combined Lots

##### 2.3.4.1 Remedial Investigation – March 2022

PWGC conducted a Remedial Investigation across each of the five lots between August and October 2021. Results of this investigation were documented in the March 2022 Remedial Investigation Report. The investigation included a limited geophysical survey, installation of 24 soil borings and 12 monitoring wells, and collection of 50 soil samples, 12 groundwater samples, six soil vapor samples, ten sub-slab soil vapor samples, one indoor air sample, and two outdoor air samples.

- The geophysical survey performed at the subject Site did not identify subsurface anomalies in the areas scanned.
- Soil Quality

- Soils beneath the subject Site appeared to contain elevated SVOCs and metals which were primarily contained within the first 3 to 9 feet bgs.
- Chromium impacted soils were observed in the northeastern portion of Former Lot 77 extending down to at least 17 feet below grade and consisted of trivalent and hexavalent chromium. Chromium concentrations exceeded Unrestricted Use SCOs but did not exceed Restricted Residential SCOs. An additional sample contained chromium at the 28 to 30 foot depth; however, the two shallower soil samples from this boring did not contain chromium exceedances. Cadmium detections did not exceed Unrestricted Use SCOs, indicating that cadmium contamination did not migrate deeper through the soil.
- TCE and PCE impact was also observed at its highest concentrations in the northeastern portion of Lot 77, but was also observed scattered throughout the subject Site. Concentrations exceeded Unrestricted Use SCOs in two soil samples.
- Pesticides, PCBs, herbicides, and PFAS did not exceed Unrestricted Use SCOs or guidance values.
- Groundwater Quality
  - TCE exceeded Ambient Water Quality standards (AWQSs) in three of the twelve groundwater samples with the highest concentrations detected in the northeastern section of Former Lot 77. TCE was also detected in each of the other nine groundwater samples, including the up-gradient groundwater samples, indicating that a regional TCE issue may also exist.
  - Chromium and/or cadmium exceeded AWQSs in two of the dissolved groundwater samples collected from the northeastern portion of Former Lot 77. Generally, chromium and cadmium are expected to have a lower rate of mobility than a compound like TCE which has only been observed at low level concentrations in the groundwater; therefore, it is believed that the presence of these compounds in the groundwater may be the result of the contamination being dragged down from the shallow soils during the installation of the monitoring wells.
  - Although SVOCs were detected in several groundwater samples, there were no exceedances of SCOs in the deepest soil samples and there was a separation of over 60 feet between the fill and the groundwater table. The presence of these SVOCs may also be a regional concern and unrelated to the Site.
  - PFAS was detected in groundwater scattered throughout the Site except in the northeastern section of Former Lot 77; there were up-gradient wells that contain exceedances, indicating that the PFAS contamination was likely a regional issue and not related to historical Site usage.
  - Pesticides and PCBs did not exceed AWQSs.

- There did not appear to be significant groundwater contamination migrating off-site.
- Soil Vapor Quality
  - CVOCs were detected throughout the subject Site with the highest concentrations detected in the north and northeastern portions of Former Lot 77. The maximum TCE concentration was 150,000  $\mu\text{g}/\text{m}^3$  and the maximum PCE concentration was 42,200  $\mu\text{g}/\text{m}^3$ . Each soil vapor sample, except the one located in the southeastern corner of the Site, indicated that mitigation was required based on the TCE concentration.
  - Petroleum related compounds were detected in several of the samples; however, concentrations were relatively low and not indicative of a significant source area of contamination.

#### 2.3.4.2 Supplemental Remedial Investigation – May 2023

PWGC conducted a Supplemental Remedial Investigation focused on Former Lot 77 between August 2022 and January 2023. Results of this investigation were documented in the Supplemental Remedial Investigation Report (SRIR) dated May 2023. The activities and findings of the May 2023 SRIR are summarized below:

- A total of 15 soil borings were installed at the subject property and a total of 25 soil samples were analyzed.
  - Soils beneath the subject property appeared to contain impacted fill material. Fill material containing elevated SVOCs and metals was primarily contained within the first 3 to 9 feet bgs.
  - Cadmium and chromium were not detected at concentrations exceeding Restricted Residential SCOs. There were detections of lead and mercury exceeding Restricted Residential SCOs in the western basement setback.
  - TCE and PCE were detected in the new soil samples; however, concentrations of TCE and PCE in soil did not exceed their respective Unrestricted Use SCOs.
  - SVOCs were identified in shallow samples within the 28-foot western setback and were consistent with fill material in shallow soils observed throughout the site.
- Six of the permanent groundwater monitoring wells were resampled to confirm results obtained during the RI for PCE, TCE, cadmium, and chromium.
  - PCE was detected, but not at a concentration exceeding its AWQS. TCE was still detected at concentrations slightly greater than its AWQS; therefore, TCE was still considered in terms of the Protection of Groundwater SCOs and PCE will be considered in terms of the Track 2 Restricted Residential and Track 4 SCOs.

- Cadmium and chromium did not contain AWQS exceedances; therefore, they were considered for the Track 2 Restricted Residential and Track 4 SCOs as detailed in the February 2023 Remedial Action Work Plan.
- Eight new soil vapor samples were collected at the subject property.
  - CVOCs were detected in each of the samples collected. The maximum TCE concentration was 194,000  $\mu\text{g}/\text{m}^3$  and the maximum PCE concentration was 3,630  $\mu\text{g}/\text{m}^3$ . DCE's maximum detection was 3,250  $\mu\text{g}/\text{m}^3$  and vinyl chloride was non-detect.
  - Petroleum related compounds were detected in several of the samples; however, concentrations were relatively low and not indicative of a significant source area of contamination.

## 2.4 REMEDIAL ACTION OBJECTIVES

The Remedial Action Objectives (RAOs) for the Site as listed in the Decision Document dated February 10, 2023, are as follows:

### 2.4.1 *Groundwater*

#### RAOs for Public Health Protection

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards.
- Prevent contact with, or inhalation of, volatiles from contaminated groundwater.

#### RAOs for Environmental Protection

- Remove the source of ground or surface water contamination.

### 2.4.2 *Soil*

#### RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of or exposure from contaminants volatilizing from contaminants in soil.

#### RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater or surface water contamination.

### 2.4.3 *Soil Vapor*

#### RAOs for Public Health Protection

- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at a site.

## 2.5 REMAINING CONTAMINATION

### 2.5.1 *Soil*

Following remediation, endpoint sample results indicated that the Site achieved a combined Track 2 Restricted Residential and Track 4 cleanup with the majority of the samples in the Track 2 area meeting Unrestricted Use SCOs. There were no exceedances of Protection of Groundwater SCOs for PCE or TCE at the final excavation depths which met or exceeded the remedial depths throughout the Site. The locations of cleanup tracks achieved at the Site are illustrated on **Figure 4**.

#### 2.5.1.1 Track 4 Areas

The Track 4 areas are located on the western and eastern sides of the Site where excavation was limited as shown on the survey included in **Appendix A**. Within the Track 4 areas, there were exceedances of Restricted Residential SCOs in SVOCs and metals consistent with the presence of sandy, silty material with fragments of brick, concrete, cinder, etc. (“fill”) material that was observed during the investigation phases of the Site. In the western Track 4 area, these exceedances were identified in each of the five bottom endpoint samples and the one sidewall sample. In the eastern Track 4 area, one of the bottom endpoint samples exceeded its Restricted Residential SCOs for SVOCs; the three other endpoint samples contained SVOCs at concentrations less than Unrestricted Use SCOs. Two of the four endpoint samples contained Unrestricted Use SCO exceedances for metals; there were no exceedances of Restricted Residential SCOs. This residual contamination will be addressed by the Site’s cover system consisting of concrete slabs that are 12 inches thick on the eastern concrete slab at the first floor, 20 inches thick on the western concrete slab at the first floor, and 16 to 20 inches thick on the ramp into the cellar. The geotextile fabric beneath the building’s foundation elements constitutes a demarcation

barrier which identifies the depths where native material is overlain by foundational elements.

The only VOC detected at a concentration greater than Unrestricted Use SCO was acetone, a typical laboratory contaminant, in two bottom endpoint samples in the western side of the Track 4 area. PCE and TCE were not detected at concentrations greater than Protection of Groundwater SCO in any of the Track 4 area endpoint samples.

#### 2.5.1.2 Track 2 Area

The Track 2 area is located in the central portion of the Site and occupies the majority of the property. Within the Track 2 area, there were exceedances of Restricted Residential SCO in SVOCs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene) in two of the bottom endpoint samples consistent with fill material. Sample EP001 was collected at 15 feet below grade. Approximately half of the area representing EP001 was excavated deeper (approximately 19 feet below grade) for footings. Sample EP047 was collected at 15 feet below grade. The area representing EP047 was fully excavated to 21 feet below grade for further VOC remediation, as noted below, and for construction. There were no other samples that contained SVOC exceedances greater than Unrestricted Use SCO.

There was one exceedance of Restricted Residential SCO for total chromium in sample EP002 at 15 feet below grade. A total of nine of the 43 Track 2 area endpoint samples contained an Unrestricted Use SCO exceedance, including the previously mentioned EP002. The metals exceedances included chromium, copper, lead, mercury, and nickel. There were no other metals exceedances of Unrestricted Use SCO in the Track 2 area.

One of the endpoint samples in the Track 2 area, EP032 at 15 feet, contained exceedances of Unrestricted Use SCO for ethylbenzene and xylene; concentrations were less than Restricted Residential SCO. Another endpoint sample, EP047 at 15 feet, contained a Protection of Groundwater SCO exceedance for TCE at a concentration of 5.2 mg/kg. Deeper soil samples were collected at EP047 at 17 feet, 19 feet, and 21 feet below grade and while TCE was still detected in each of the samples, it was at concentrations less



than TCE's Protection of Groundwater SCO at each interval deeper than 15 feet. PCE did not exceed Unrestricted Use or Protection of Groundwater SCOs in soil endpoint samples.

As no excavations extended deeper than the building's construction excavation depth, the concrete foundation for the building serves as the demarcation layer above the residual soil impact, as well as the Site's cover system in the Track 4 areas of the Site.

**Table 2** (attached) and **Figure 5** summarize the results of soil samples collected that exceed the Unrestricted Use SCOs, Protection of Groundwater SCOs for PCE and TCE, and the Restricted Residential Use SCOs at the Site after completion of remedial action.

### 2.5.2 *Soil Vapor*

Although the bulk of the source material within the soil was removed as part of the remediation, residual soil vapor impacts may still be present at the Site. During the Supplemental RI, additional deeper soil vapor samples were collected at 21 feet below grade, the proposed depth of the new building foundation. At 21 feet below grade, the maximum PCE concentration detected was 1,840  $\mu\text{g}/\text{m}^3$  and the maximum TCE concentration detected was 194,000  $\mu\text{g}/\text{m}^3$ . The highest concentrations were detected in the western section of the Site.

The residual soil vapor impact will be mitigated and remediated through installation and operation of a soil vapor extraction (SVE) system and a sub-slab depressurization system (SSDS). The details of these systems are discussed in Section 3 of this report.

For reference, a spider diagram with the historical soil vapor concentrations from soils not disturbed during remediation and construction activities has been included as **Figure 6** (attached) and the data is included in **Table 3**.

### 2.5.3 *Groundwater*

Groundwater Quality was characterized as part of the RI and select wells were resampled during the SRI due to exceedances observed during the RI. The nature and extent of residual groundwater impact following the SRI is detailed below:

- Following the SRI sampling, MW001 contained an exceedance of TCE at 5.56  $\mu\text{g}/\text{L}$  and MW004 contained an exceedance of TCE at 5.11  $\mu\text{g}/\text{L}$ . Chloroform

was also observed exceeding AWQS in several wells and during multiple sampling events throughout the Site.

- Low-level concentrations of several SVOCs, specifically PAH compounds, were observed in several groundwater samples across the Site that are consistent with a regional condition and do not appear to be related to a discharge from the Site.
- Dissolved cadmium and chromium concentrations exceeding AWQS originally observed in the groundwater during the RI sampling were not observed during the SRI re-sampling.
- There were no exceedances for PFAS, pesticides, or PCBs.

For reference, a spider diagram with the historical groundwater concentrations from before construction activities were performed has been included as **Figure 7** and the data is included in **Table 4**.

### 3.0 INSTITUTIONAL AND ENGINEERING CONTROL PLAN

#### 3.1 GENERAL

Since remaining contamination exists at the Site, Institutional Controls (ICs) and Engineering Controls (ECs) are required to protect human health and the environment. This IC/EC Plan describes the procedures for the implementation and management of IC/ECs at the Site. The IC/EC Plan is one component of the SMP and is subject to revision by the NYSDEC project manager.

This plan provides:

- A description of IC/ECs on the Site;
- The basic implementation and intended role of each IC/EC;
- A description of the key components of the ICs set forth in the Environmental Easement;
- A description of the controls to be evaluated during each required inspection and periodic review;
- A description of plans and procedures to be followed for implementation of IC/ECs, such as the implementation of the Excavation Work Plan (EWP) (as provided in **Appendix C**) for the proper handling of remaining contamination that may be disturbed during maintenance or redevelopment work on the Site; and
- Other provisions necessary to identify or establish methods for implementing the IC/ECs required by the Site remedy, as determined by the NYSDEC project manager.

#### 3.2 INSTITUTIONAL CONTROLS

A series of ICs is required by the Decision Document to: (1) implement, maintain and monitor Engineering Control systems; (2) prevent future exposure to remaining contamination; and (3) limit the use and development of the Site to restricted-residential, commercial, and/or industrial uses only. Adherence to these ICs on the Site is required by the Environmental Easement and will be implemented under this SMP. ICs identified in the Environmental Easement may not be discontinued without an amendment to or extinguishment of the Environmental Easement. The IC boundaries are shown on the survey included in **Appendix A**. These ICs are:

- The property may be used for: restricted residential use, commercial, and industrial uses as defined in Part 375-1.8(g), subject to local zoning laws;

- ECs must be operated and maintained as specified in this SMP;
- The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDEC or the NYSDOH to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the NYSDEC;
- Environmental or public health monitoring must be performed as defined in this SMP;
- Data and information pertinent to Site management must be reported at the frequency and in a manner as defined in this SMP;
- Future activities that will disturb remaining contaminated material must be conducted in accordance with this SMP;
- Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in this SMP;
- Operation, maintenance, monitoring, inspection, and reporting of mechanical or physical component of the remedy shall be performed as defined in this SMP;
- Access to the Site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by the Environmental Easement;
- Vegetable gardens and farming on the Site are prohibited; and
- ECs must be inspected at a frequency and in a manner defined in the SMP.
- The Site owner must complete and submit to the NYSDEC a periodic certification of institutional and engineering controls (ICs and ECs) in accordance with Part 375-1.8(h)3.

**Appendix D** details the site responsibilities and key personnel.

### **3.3 ENGINEERING CONTROLS**

#### *3.3.1 Cover System*

Exposure to remaining contamination at the Site is prevented by a cover system placed over the Track 4 portions of the Site. This cover system is comprised of concrete slabs that are 12 inches thick on the eastern concrete slab at the first floor, 20 inches thick on the western concrete slab at the first floor, and 16 to 20 inches thick on the ramp into the cellar. The placement and construction of the site cover is included in the As-Built drawings in **Appendix E**. The Excavation Work Plan (EWP) provided in **Appendix F**

outlines the procedures required to be implemented in the event the cover system is breached, penetrated, or temporarily removed. Procedures for the inspection of this cover are provided in the Monitoring and Sampling Plan included in Section 4.0 of this SMP. Work conducted pursuant to the EWP must also be conducted in accordance with the procedures defined in a Health and Safety Plan (HASP), provided as **Appendix G**, and the Community Air Monitoring Plan (CAMP) included in **Appendix H**. A breach of the Site's cover system must be overseen by a Professional Engineer (PE) who is licensed and registered in New York State or a qualified person who directly reports to a PE who is licensed and registered in New York State.

In the event that activities which necessitate the breach of the Site cover system will also include the reuse of on-Site soil material and/or import soil/fill material from an off-Site source, then a NYSDEC Request to Reuse/Import Fill Form must be completed and submitted to NYSDEC prior to these activities. The NYSDEC Request to Reuse/Import Fill Form is included in **Appendix F**.

### *3.3.2 Sub-Slab Depressurization System (SSDS)*

An SSDS has been installed beneath the new building footprint to mitigate potential soil vapor intrusion into the new building. The SSDS was installed in a trench format beneath the cellar and the portion of the first floor that is in contact with the soil. The riser is currently under construction and will be routed through the building and terminate above the roof level when completed. As construction progresses, a blower will be connected to the riser on the roof and the effluent vent for the blower will terminate above the roof level. It is expected that the SSDS will be activated in the year 2025 prior to the occupancy of the new building.

The SSDS piping consists of a Geovent system placed within a 4-inch thick layer of ½-inch to 1-inch crushed stone beneath the basement slab and first floor slabs that are in contact with the soil. A non-woven geotextile fabric has been placed beneath the stone layer to reduce fines from entering the system. The Geovent is connected to galvanized closed duct riser piping that will be routed through the building and to the roof. The sub-cellular Geovent will be connected to 6-inch diameter galvanized closed duct which increases to an 8-inch and then a 10-inch duct as it manifolds together. To transition from beneath

the mat slab area and the slab-on-grade area, a section of solid 4-inch diameter Schedule 80 PVC is connected to a 90-degree elbow on each end which connects to the sections of Geovent beneath the mat slab and the slab-on-grade. The sub-first-floor Geovent on the west side of the property will be connected to 8-inch diameter galvanized closed duct piping and on the east side of the property it will be connected to 6-inch diameter schedule 80 PVC beneath the ramp and then 8-inch diameter galvanized closed duct piping as it penetrates the cellar wall; this duct piping will be routed through the top of the cellar and manifolded to the riser piping from the sub-cellar SSDS piping and continue up the building. The riser finished above the roofline with 10-inch diameter closed duct piping. The SSDS riser piping will be connected to a Cincinnati Fan model HP-8B18, 5.0 horsepower, three-phase, 208-volt blower. The discharge point of the SSDS will be located above the eave of the roof, a minimum of 10 feet from an opening that is less than 2 feet below the exhaust point, and a minimum of 10 feet from adjoining or adjacent buildings or HVAC intakes or supply registers. As-built drawings of the current construction status and manufacturer specifications for the SSDS system blower are included as **Appendix E**. It is anticipated that activation of the SSDS will occur after this SMP is approved; once activation is completed, the SMP and as-built drawings will be updated to reflect actual installed conditions.

Since the SSDS is not proposed to begin operation with carbon treatment, a DAR-1 analysis was performed and is included as **Appendix I**. The DAR-1 analysis was focused on the two contaminants of concern, PCE and TCE, and the specifications of the SSDS and stack height. A conservative approach was utilized for the PCE analysis, using the maximum concentration detected at the Site, 42,200  $\mu\text{g}/\text{m}^3$  (SV006 at 10 feet below sidewalk grade). The DAR-1 analysis provided estimated emission rates of 2.63  $\mu\text{g}/\text{m}^3$  for the 1-hour scenario and 0.263  $\mu\text{g}/\text{m}^3$  for the annual scenario, both of which are less than the DAR-1 Guideline concentrations of 300  $\mu\text{g}/\text{m}^3$  for the 1-hour scenario and 3.8  $\mu\text{g}/\text{m}^3$  for the annual scenario. For TCE, a composite concentration was utilized which included the maximum concentration of 194,000  $\mu\text{g}/\text{m}^3$  (SV015 at 21 feet below sidewalk grade) and other concentrations throughout the Site, including other soil vapor concentrations at 21 feet below grade throughout the western and northern portions of the Site and sub-slab soil vapor concentrations in the southeastern portion of the Site (the list of each sample and

concentration utilized in this composite sample is included in **Appendix I**). This method is anticipated to be conservative as the source material shallower than 21 feet has been removed as part of remediation and construction. The DAR-1 analysis for this composite concentration provided estimated TCE emission rates for the 1-hour ( $1.90 \mu\text{g}/\text{m}^3$ ) and annual ( $0.190 \mu\text{g}/\text{m}^3$ ) scenarios that were less than the DAR-1 Guideline concentrations of  $20 \mu\text{g}/\text{m}^3$  and  $0.21 \mu\text{g}/\text{m}^3$ , respectively.

The SSDS start date will be after the Certificate of Completion (COC) is issued and prior to occupation of the building. The results of the SSDS start-up and field extension testing will be submitted to NYSDEC and NYSDOH for approval before building occupancy begins. Prior to full-time operation of the SSDS, an effluent sample will be collected to confirm that discharge treatment is not required. Routine effluent sampling will be conducted as per Section 5 of this SMP. As discussed in the next section, the SVE start date will be prior to issuance of the COC.

Procedures for operating and maintaining the SSDS are documented in the Operation and Maintenance Plan (Section 5.0 of this SMP). As-built drawings, signed and sealed by a PE who is licensed and registered in New York State, are included in **Appendix E – Operations, Maintenance, and Monitoring Manual**.

### *3.3.3 Soil Vapor Extraction (SVE) System*

A SVE system has been installed beneath the cellar and is focused in the area of elevated chlorinated solvent impacts observed in the soil vapor. Two of the SVE wells are located in the suspected source area of the contamination beneath the mat slab and the other six wells are located north of this area, spaced approximately 20 feet on center from each other, to prevent off-site migration north of the subject property.

The system has been designed to overcome the adsorption of the volatile contaminants of concern mainly through applying a vacuum of at least 0.1-inch of water column (w.c.) to the impacted soils. A total system vacuum ranging from 15 to 33-inches of w.c. at a design flow rate of 350 to 700 CFM was utilized for the basis of design in fan selection. This estimates that each well will operate at approximately 50 to 100 CFM and 2 to 5-inches of w.c. while considering head losses through wells and ducting system. While these are the anticipated operational parameters, the fan has been selected to provide

up to 26-inches of w.c. and a flow rate of up to 1,250 CFM. The fan is provided with variable speed control to make operation as energy efficient as possible based on the initial balancing of the system. Based on these system operating parameters and the soil characteristics (medium sands), a radius of influence of approximately 25 feet was determined. Verification of system effectiveness is determined through effluent sampling analysis during system operation.

Each SVE well point was installed at a bottom elevation of 24 feet (approximately 56 feet below sidewalk grade). The SVE wells were constructed of 4-inch diameter schedule 40 PVC with 35 feet of 20-slot screen and riser to just below the top of slab (approximately 17 feet below sidewalk grade). Each of the six northern SVE well heads were finished with a j-plug and a flush mounted manhole cover at the slab to allow access to these wells for future testing during system operation. The well annuli were backfilled with #00 gravel to the top of the well screen and then a bentonite seal to the bottom of the sub-slab gravel layer. The six north SVE wells were interconnected to each other with 4-inch diameter schedule 80 solid PVC and the two middle SVE wells are interconnected to each other with 6-inch diameter schedule 80 solid PVC.

The SVE wells are manifolded together and connected to 8-inch diameter galvanized closed duct which is routed up to above the building's roof. The SVE system ducting is connected to an Ametek fan model Nautilair – NP140-3N02C-002. Four 55-gallon drums of granular activated carbon to filter the SVE effluent are plumbed parallel in a lead-lag configuration. The drums are configured in two legs with a lead drum and a lag drum on each leg. The permanent discharge point is set above the eave of the roof and is located more than 10 feet from any opening that is less than 2 feet below the exhaust point and more than 10 feet from any adjoining or adjacent buildings or HVAC intakes or supply registers.

The location of the SVE system's discharge point is shown on the as-built drawings included in **Appendix E**. The manufacturer specifications for the SVE system's blower are included as **Appendix E**.



The SVE system is connected to a remote telemetry system which measures vacuum, temperature, and humidity. An alarm is triggered if a low vacuum or a high vacuum condition is encountered.

Sampling ports are located on each riser section of the SVE system's legs (SVE Well #01 through #06 is one leg, SVE Well #07 and #08 is the other leg) prior to their union and on the roof there is a combined influent sampling port, mid-point carbon sampling ports, and a combined effluent sampling port.

To demonstrate sufficient ROI of the SVE system, three SVE wells (SVE Well #02, SVE Well #04, and SVE Well #06) from the northern cluster were temporarily utilized as SVE vacuum monitoring points in December 2023 while the system was activated temporarily to confirm system operation. This temporary SVE system, with an Ametek Nautilair NP140 variable speed fan, was not put into full operation at that time. This test was repeated with the installation of the permanent system, which consisted of relocating the temporary system to the mechanical room, by the following process (conducted separately for each of the three selected wells):

- Tubing was installed through a sanitary grommet and the penetration was sealed.
- The selected SVE well was isolated by lowering the sanitary grommet in-place at the top of the well, below the manifold piping, utilizing an extension rod. This prevented the well from receiving vacuum from the manifold piping.
- The extension rod was secured in place.
- A manometer was connected to the tubing at the top of the well head to measure the vacuum in the SVE well during SVE system operation.
- Manometer readings confirmed that the isolated well received sufficient vacuum from the neighboring well(s); therefore demonstrating the northern SVE well locations met the minimum expected radius of influence.

System start-up of the permanent SVE began on October 8, 2024. Results of the testing on the permanent SVE system, conducted on October 8, 2024, indicate that the radius of influence of each of the SVE wells is extending beyond the neighboring SVE wells, so there is no gap in coverage. The following vacuum readings were collected for each of the three wells:

- SVE Well #02 – 0.28 inches of water column

- SVE Well #04 – 0.47 inches of water column
- SVE Well #06 – 0.47 inches of water column.

Procedures for operating and maintaining the SVE system are documented in the Operation and Maintenance Plan (Section 5.0 of this SMP). As-built drawings, signed and sealed by a PE who is licensed and registered in New York State, are included in **Appendix E – Operations and Maintenance Manual**.

### *3.3.4 Criteria for Completion of Remediation/Termination of Remedial Systems*

Generally, remedial processes are considered completed when monitoring indicates that the remedy has achieved the remedial action objectives identified by the decision document. The framework for determining when remedial processes are complete is provided in Section 6.4 of NYSDEC DER-10. Unless waived by the NYSDEC, confirmation samples of applicable environmental media are required before terminating remedial actions at the Site. Confirmation samples require Category B deliverables and a Data Usability Summary Report (DUSR).

As discussed below, the NYSDEC may approve termination of a remedial or mitigation system. When a remedial party receives this approval, the remedial party will decommission Site-related wells as per the NYSDEC CP-43 policy.

The remedial party will also conduct needed Site restoration activities, such as asphalt patching and decommissioning treatment system equipment. In addition, the remedial party will conduct necessary restoration of vegetation coverage, trees and wetlands, and will comply with NYSDEC and United States Army Corps of Engineers regulations and guidance. Also, the remedial party will ensure that no ongoing erosion is occurring on the Site.

#### 3.3.3.1 Site Cover

The site cover system in the Track 4 areas of the Site is a permanent control and the quality and integrity of this system will be inspected at defined, regular intervals in accordance with this SMP in perpetuity.

### 3.3.3.2 Sub-Slab Depressurization System (SSDS)

The SSDS will not be discontinued unless prior written approval is granted by the NYSDEC and the NYSDOH project managers. If monitoring data indicates that the SSDS may no longer be required, a proposal to discontinue the SSDS will be submitted by the remedial party to the NYSDEC and NYSDOH project managers.

### 3.3.3.3 Soil Vapor Extraction System (SVE) System

The SVE system will not be discontinued unless prior written approval is granted by the NYSDEC project manager. In the event that monitoring data indicates that the SVE system may no longer be required, a proposal to discontinue the system will be submitted by the remedial party to the NYSDEC project manager. Conditions that may warrant discontinuing the SVE system include contaminant concentrations in groundwater and/or soil that: (1) reach levels that are consistently below ambient water quality standards or the Site SCGs, as appropriate; (2) have become asymptotic to a low level over an extended period of time, as accepted by the NYSDEC; or (3) the NYSDEC has determined that the SVE system has reached the limit of its effectiveness. This assessment will be based in part on post-remediation contaminant levels in soil vapor collected from the system's sampling ports. Systems will remain in place and operational until permission to discontinue their use is granted in writing by the NYSDEC project manager.

## 4.0 MONITORING AND SAMPLING PLAN

### 4.1 GENERAL

This Monitoring and Sampling Plan describes the measures for evaluating the overall performance and effectiveness of the remedy. This Monitoring and Sampling Plan may only be revised with the approval of the NYSDEC project manager. Details regarding the sampling procedures, data quality usability objectives, analytical methods, etc. for samples collected as part of Site management for the Site are included in the Quality Assurance Project Plan provided in **Appendix J**.

This Monitoring and Sampling Plan describes the methods to be used for:

- Sampling and analysis of appropriate media (indoor air and soil vapor);
- Assessing compliance with applicable NYSDEC standards, criteria and guidance (SCGs), particularly groundwater standards and Part 375 SCOs for soil; and
- Evaluating Site information periodically to confirm that the remedy continues to be effective in protecting public health and the environment;

To adequately address these issues, this Monitoring and Sampling Plan provides information on:

- Sampling locations, protocol and frequency;
- Information on designed monitoring systems;
- Analytical sampling program requirements;
- Inspection and maintenance requirements for monitoring wells;
- Monitoring well decommissioning procedures; and
- Annual inspection and periodic certification.

Reporting requirements are provided in Section 7.0 of this SMP.

### 4.2 SITE – WIDE INSPECTION

Site-wide inspections will be performed at a minimum of once per year. These periodic inspections must be conducted when the ground surface is visible (i.e. no snow cover). Site-wide inspections will be performed by a Professional Engineer (PE) who is licensed and registered in New York State or a qualified person who directly reports to a PE who is licensed and registered in New York State. Modification to the frequency or

duration of the inspections will require approval from the NYSDEC project manager. Site-wide inspections will also be performed after severe weather conditions that may affect ECs or monitoring devices. During these inspections, an inspection form will be completed as provided in **Appendix K – Site Management Forms**. The form will compile sufficient information to assess the following:

- Compliance with ICs, including Site usage;
- An evaluation of the condition and continued effectiveness of ECs;
- General Site conditions at the time of the inspection;
- Whether stormwater management systems, such as basins and outfalls, are working as designed;
- The Site management activities being conducted including, where appropriate, confirmation sampling and a health and safety inspection; and
- Confirm that Site records are up to date.

Inspections of remedial components installed at the Site will be conducted. A comprehensive Site-wide inspection will be conducted and documented according to the SMP schedule, regardless of the frequency of the Periodic Review Report. The inspections will determine and document the following:

- Whether ECs continue to perform as designed;
- If these controls continue to be protective of human health and the environment;
- Compliance with requirements of this SMP and the Environmental Easement;
- Achievement of remedial performance criteria; and
- If Site records are complete and up to date.

Reporting requirements are outlined in Section 7.0 of this plan.

Inspections will also be performed in the event of an emergency. If an emergency, such as a natural disaster or an unforeseen failure of the ECs occurs that reduces or has the potential to reduce the effectiveness of ECs in place at the Site, verbal notice to the NYSDEC project manager must be given by noon of the following day. In addition, an inspection of the Site will be conducted within 5 days of the event to verify the effectiveness of the IC/ECs implemented at the Site by a qualified environmental professional, as defined in 6 NYCCR Part 375. Written confirmation must be provided to

the NYSDEC project manager within 7 days of the event that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public. The remedial party will submit follow-up status reports to the NYSDEC within 45 days of the event on actions taken to respond to an emergency event requiring ongoing responsive action, describing and documenting actions taken to restore the effectiveness of the ECs.

### **4.3 ENGINEERING CONTROL SYSTEM MONITORING AND SAMPLING**

#### *4.3.1 SVE System Monitoring*

Monitoring of the SVE System will be performed on a routine basis. The monitoring of remedial systems must be conducted by a Professional Engineer (PE) who is licensed and registered in New York State or a qualified person who directly reports to a PE who is licensed and registered in New York State. Modification to the frequency or sampling requirements will require approval from the NYSDEC project manager. A visual inspection of the complete system will be conducted during each monitoring event. Unscheduled inspections and/or sampling may take place when a suspected failure of the SVE system has been reported or an emergency occurs that is deemed likely to affect the operation of the system. SVE system components to be monitored include, but are not limited to, the following components on a minimum annual basis:

- The vacuum blower, vacuum, flow rate, and temperature.
- General system piping.
- Effluent vapor concentrations.

A complete list of components to be inspected is provided in the Inspection Checklist, provided in **Appendix K** - Site Management Forms. If equipment readings are not within their specified operation range, equipment is observed to be malfunctioning or the system is not performing within specifications; maintenance and repair, as per the Operation and Maintenance Plan, is required immediately.

#### *4.3.2 SSDS Monitoring*

Monitoring of the SSDS will be performed on a routine basis. The monitoring of remedial systems must be conducted by a Professional Engineer (PE) who is licensed and

registered in New York State or a qualified person who directly reports to a PE who is licensed and registered in New York State. Modification to the frequency or sampling requirements will require approval from the NYSDEC project manager. A visual inspection of the complete system will be conducted during each monitoring event. Unscheduled inspections and/or sampling may take place when a suspected failure of the SSDS has been reported or an emergency occurs that is deemed likely to affect the operation of the system. SSDS components to be monitored include, but are not limited to, the following components on a minimum annual basis:

- The vacuum blower, vacuum, flow rate, and temperature.
- General system piping.
- Effluent vapor concentrations.
- Sub-slab vacuum from the vacuum monitoring points.

A complete list of components to be inspected is provided in the Inspection Checklist, provided in **Appendix K** - Site Management Forms. If equipment readings are not within their specified operation range, equipment is observed to be malfunctioning, or the system is not performing within specifications, then maintenance and repair, as per the Operation and Maintenance Plan, is required immediately.

#### *4.3.3 Engineering Control System Sampling*

Samples shall be collected from the SVE System and SSDS initially during the startup phase, the initial PRR period (16 months), and then on a routine/annual basis. Additionally, the SVE system's combined effluent and carbon mid-point samples will be sampled on Week 2, Month 3, and Quarters 2 through 5 during the first monitoring period prior to the issuance of the first Periodic Review Report (PRR) and then annually thereafter, as further detailed in the OM&M Plan included as **Appendix E**. The SSDS combined effluent will initially be sampled 24 hours after system operation begins to confirm that carbon treatment is not required of the effluent discharge and then on an annual basis thereafter.

The samples will be collected in 2.4L summa canisters, batch certified clean, as grab samples and analyzed for VOCs by USEPA method TO-15. Additional samples may be collected on an as-needed basis as indicated by system performance and/or Site

conditions from individual legs of the SVE system or SSDS, from their combined influent sampling ports, or from the vacuum monitoring points to evaluate system performance.

Modification to the frequency or sampling requirements will require approval from the NYSDEC project manager.

Detailed sample collection and analytical procedures and protocols are provided in **Appendix J** – Quality Assurance Project Plan.

The remedial party will properly dispose of wastes generated by the remedial system at off-site disposal facilities according to local, state, and federal laws and regulations. Wastes will be tested before disposal to comply with the permit conditions of the disposal facility. Wastes generated at this Site include spent activated carbon. An appropriately licensed vendor will be selected to remove the spent activated carbon and properly dispose of it, recycle it, or regenerate it. The vendor will be supplied with influent and effluent data, as needed, to ensure proper disposal of the spent material.

#### *4.3.4 Monitoring and Sampling Protocol*

Sampling activities will be recorded in a field book and associated sampling log as provided in **Appendix K** - Site Management Forms. Other observations (e.g., groundwater monitoring well integrity) will be noted on the sampling log. The sampling log will serve as the inspection form for the monitoring network. The SSDS and SVE System sampling schedule and sampling parameters are included in **Table 5**.



**Table 5 – Remedial and Mitigation System Sampling Requirements and Schedule**

Sampling Location	Analytical Parameters	Schedule
	VOCs (EPA Method TO-15)	
Indoor air samples located near the nine VMPs	X	Annually
SSDS Effluent	X	24-hours after start-up, then Annually
SVE System Influent, Mid-Points, and Effluent	X	Week 2 of first PRR period, Month 3 of first PRR period, then quarterly for remainder of first PRR period, then Annually.

## 5.0 OPERATION AND MAINTENANCE PLAN

### 5.1 GENERAL

This Operation and Maintenance Plan provides a brief description of the measures necessary to operate, monitor and maintain the mechanical components of the remedy selected for the Site. This Operation and Maintenance Plan:

- Includes the procedures necessary to allow individuals unfamiliar with the Site to operate and maintain the SSDS and SVE systems;
- Will be updated periodically to reflect changes in Site conditions or the manner in which the SSDS and SVE systems are operated and maintained.

Further detail regarding the Operation and Maintenance of the SSDS and SVE systems is provided in **Appendix F** - Operation and Maintenance Manual. A copy of this Operation and Maintenance Manual, along with the complete SMP, is to be maintained at the Site. This Operation and Maintenance Plan is not to be used as a stand-alone document, but as a component document of this SMP.

### 5.2 SVE SYSTEM

#### 5.2.1 SVE System Performance Criteria

**Table 6: SVE System Performance Criteria and Monitoring Schedule**

SVE Component	Monitoring Parameter	Operating Range	Monitoring Schedule
Blower	Flow Rate	400-1,250 CFM	Weekly / Monthly / Quarterly for 1st year, then annually
Blower	Vacuum (at blower)	1-33 inches of WC	Weekly / Monthly / Quarterly for 1st year, then annually
Blower	Operating Temperature	Approx 50-100 degrees F	Weekly / Monthly / Quarterly for 1st year, then annually
Wells	Vacuum Influence	50-125 CFM and 1-5 inches of WC	At Start-Up

### 5.2.2 *Operation and Maintenance of SVE System*

The following sections provide a description of the operations and maintenance of SVE system. Cut-sheets and as-built drawings for the SVE system are provided in **Appendix F - Operations and Maintenance Manual**.

### 5.2.3 *System Start-Up and Testing*

Initial start-up and testing of the SVE system was conducted. Review of system components before and after start-up included:

- Inspection of piping, fittings, and equipment to ensure there were no leaks;
- Review of equipment to ensure it was operating according to manufacturer's specifications;
- System balancing;
- Checking that system alarms were functional; and
- Collection of a combined influent and combined effluent sample approximately 1 week after sustained start-up.

In addition, the northern SVE wells were further tested to confirm that sufficient ROI was achieved. Following the initial system start-up, three SVE wells from the northern cluster were temporarily utilized as SVE vacuum monitoring points by the following process:

- Tubing was installed through a sanitary grommet and the penetration was sealed.
- The selected SVE well was isolated by lowering the sanitary grommet in-place at the top of the well, below the manifold piping, utilizing an extension rod. This prevented the well from receiving vacuum from the manifold piping.
- The extension rod was secured in place.
- A manometer was connected to the tubing at the top of the well head to measure the vacuum in the SVE well during SVE system operation.
- Manometer readings confirmed that the isolated well received sufficient vacuum from the neighboring well(s); therefore demonstrating the northern SVE well locations met the minimum expected radius of influence.

The system testing described above will be conducted and the radius of influence will be reevaluated if, in the course of the SVE system lifetime, the system goes down for an extended period of time or significant changes are made to the system and the system

must be restarted. Following system restart, influent and effluent samples will be collected as well.

#### *5.2.4 Routine System Operation and Maintenance*

Routine O&M of the SVE will be performed initially on a weekly basis for the first four weeks, then on a monthly basis for the next two months, then on a quarterly basis for the first five quarters of operation within the first reporting period and then annually thereafter and will include assessing the system's current condition.

A visual inspection of the complete system will be conducted during each monitoring event. Unscheduled inspections and/or sampling may take place when a suspected failure of the SVE system has been reported or an emergency occurs that is deemed likely to affect the operation of the system. The inspection should include review of system components including piping, concrete slab integrity, radon fans, and low vacuum alarms, to ensure components are functioning effectively. If leaks are observed, they should be immediately repaired. Additionally, the location of the exhaust vent should be observed to ensure no air intakes have been located within a 10 foot radius.

If the system is not operating per design, troubleshooting of the system will commence and deficient items will be corrected. It is anticipated that the SVE system will operate continuously until written approval from the NYSDEC and NYSDOH states otherwise.

Inspection forms are included in **Appendix F**.

#### *5.2.5 Non-Routine Operation and Maintenance*

In the event that non-routine maintenance is needed, the following information will be recorded and included in the subsequent status report:

- Description of the damage or malfunction;
- Level and duration of reduced effectiveness;
- Other repairs or adjustments made to the system.

#### *5.2.6 System Monitoring Devices and Alarms*

The SVE system has a warning device to indicate that the system is not operating properly. In the event that warning device is activated, applicable maintenance and repairs

will be conducted, as specified in the Operation and Maintenance Plan, and the SVE system will be restarted. Operational problems will be noted in the Periodic Review Report to be prepared for that reporting period.

### 5.3 SSDS

#### 5.3.1 *SSDS Performance Criteria*

**Table 7: SSDS Performance Criteria and Monitoring Schedule**

<b>SSDS Component</b>	<b>Monitoring Parameter</b>	<b>Operating Range</b>	<b>Monitoring Schedule</b>
Blower	Vacuum (at blower)	1-22 inches of WC	Weekly / Monthly / Quarterly for 1 <sup>st</sup> PRR period, then annually
VMPs (VMP-1 through VMP-9)	Vacuum	Minimum 0.002 inches of WC	Weekly / Monthly / Quarterly for 1 <sup>st</sup> PRR period, then annually

#### 5.3.2 *Operation and Maintenance of SSDS*

The following sections provide a description of the operations and maintenance of SSDS. Cut-sheets and as-built drawings for the SSDS are provided in **Appendix E – Operations and Maintenance Manual**.

#### 5.3.3 *System Start-Up and Testing*

Initial start-up and testing of the SSDS will be conducted before the building is occupied. Review of system components before and after start-up will be conducted, including but not limited to;

- Inspection of piping, fittings, and equipment to ensure there are no leaks;
- Review of equipment to ensure it is operating according to manufacturer's specifications;
- System balancing;
- Check that system alarms are functional;
- Inspection of vacuum monitoring points and collection of vacuum readings below the building slabs; and
- Collection of an influent and effluent sample approximately 24 hours after sustained system start-up.

The system testing described above will be conducted if, in the course of the SSDS lifetime, the system goes down or significant changes are made to the system and the system must be restarted.

#### *5.3.4 Routine System Operation and Maintenance*

Routine O&M of the SSDS will be performed initially on a weekly basis for Week 1, Week 2, and Week 4, then on a monthly basis for Months 2 and 3, and then annually thereafter and will include assessing the system's current condition.

A visual inspection of the complete system will be conducted during each monitoring event. Unscheduled inspections and/or sampling may take place when a suspected failure of the SSDS has been reported or an emergency occurs that is deemed likely to affect the operation of the system. The inspection should include review of system components including piping, concrete slab integrity, radon fans, vacuum monitoring points, and low vacuum alarms, to ensure components are functioning effectively. If leaks are observed, they should be repaired as soon as possible. Additionally, the location of the exhaust vent should be observed to ensure no air intakes have been located within a 10-foot radius.

The system's performance will be monitored to ensure a proper minimum vacuum is observed at the vacuum monitoring points. Each vacuum monitoring point shall be tested for a minimum vacuum of 0.002 inches of w.c. If the vacuum does not meet the minimum requirement of 0.002 inches of w.c., the system will be adjusted to meet the condition. Vacuum readings should be recorded on the O&M Logs included in the OM&M Plan attached as **Appendix E**.

If the system is not operating per design, troubleshooting of the system will commence and deficient items will be corrected. It is anticipated that the SSDS will operate continuously until written approval from the NYSDEC and NYSDOH states otherwise.

#### *5.3.5 Non-Routine Operation and Maintenance*

In the event that non-routine maintenance is needed, the following information will be recorded and included in the subsequent status report:

- Description of the damage or malfunction;

- Level and duration of reduced effectiveness;
- Other repairs or adjustments made to the system.

#### *5.3.6 System Monitoring Devices and Alarms*

The SSDS has a warning device to indicate that the system is not operating properly. In the event that warning device is activated, applicable maintenance and repairs will be conducted, as specified in Section 3.2 of the Operation and Maintenance Plan, and the SSDS will be restarted. Operational problems will be noted in the Periodic Review Report to be prepared for that reporting period.

### **5.4 FIRE SAFETY**

In the event of a fire or explosion, procedures will include immediate evacuation of the Site (air horn will sound for a single continuous blast) and notification of local fire and police departments. No Site personnel will fight a fire beyond the stage where it can be put out with a portable extinguisher (incipient stage). Adhering to the following precautions will help prevent fires:

- Good housekeeping and storage of materials;
- Storage of flammable liquids and gases away from oxidizers;
- No smoking in the exclusion zone or work area;
- No hot work without a properly executed hot work permit;
- 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 heavy equipment, in trailers and near hot work activities; and
- Monthly inspections of fire extinguishers.

The remedial party will conduct an annual facility walk with the local fire chief and/or fire suppression team, if available. The Site walk will allow for the addition of the facility to local preplanning efforts. The NYSDEC project manager will be provided with the local fire chief's/fire suppression team's recommendations as soon as they become available. Following review, the NYSDEC project manager may direct the remedial party to implement the recommendations and/or revise the SMP.

## **6.0 PERIODIC ASSESSMENTS / EVALUATIONS**

### **6.1 CLIMATE CHANGE VULNERABILITY ASSESSMENT**

Increases in both the severity and frequency of storms/weather events, an increase in sea level elevations along with accompanying flooding impacts, shifting precipitation patterns and wide temperature fluctuation, resulting from global climactic change and instability, have the potential to significantly impact the performance, effectiveness and protectiveness of a given Site and associated remedial systems. Vulnerability assessments provide information so that the Site and associated remedial systems are prepared for the impacts of the increasing frequency and intensity of severe storms/weather events and associated flooding.

This section provides a current vulnerability assessment that evaluates the vulnerability of the Site and/or engineering controls to severe storms/weather events and associated flooding. This section also identifies vulnerability assessment updates that will be conducted for the Site in Periodic Review Reports.

**Flood Plain:** According to Effective Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) No. 3604970063B, the Site is not located within the 100-year or 500-year flood zones. As such, it does not appear that the Site is vulnerable to flooding or storm surge events.

**Sea Level Rise:** The Site is over one mile from the East River and Gowanus Canal, and the Site is approximately 79 feet above sea level. Furthermore, the subgrade piping for the SSDS and SVE Systems are set more than ten feet above the static groundwater table elevation. The Site, and its subgrade remedial and mitigation components, is unlikely to be flooded during a storm surge event or be susceptible to sea level rise.

**Site Drainage and Storm Water Management:** The Site is designed with a stormwater detention system; therefore, the Site has minimal risk of flooding relating to stormwater management.

**Erosion:** The Site is fully capped with concrete building slabs and concrete walkways; therefore, the Site has minimal risk of erosion.



High Wind: NYC Building Code has structural design requirements for buildings to be able to resist wind pressures. The new Site building was designed with this in mind; therefore, the Site has minimal risk of wind damage.

Drought: There are no wells beneath the property that rely on the presence of water; therefore, the lack of groundwater would have minimal effect.

Electricity: NYC Building Code has electrical design components for new buildings. The new Site building was designed with this in mind. The Site will receive electrical service from Consolidated Edison, Inc. (Con Edison). A power loss or dips/surges in voltage may impact the building's equipment and operations. The SSDS and SVE System control panels may shut down the system in the event of a dip or surge in voltage. Remote monitoring equipment will be utilized to determine if the systems are not operating.

Spill/Contaminant Release: The new building does not incorporate petroleum storage and there is limited potential for release of common chemicals used for cleaning and maintenance of the building. Commercial uses of the property are anticipated to be typical retail uses and are unlikely to have significant chemical storage on-Site. The risk of a spill at the Site is low.

Wildfires: The Site is in a dense, urban area with minimal trees or landscaping in the surrounding area; therefore, it is unlikely to be impacted by wildfire.

ECs will be inspected after severe weather or other emergency conditions (natural disasters or fires) that are known to have inflicted damage at the Site or adjoining properties and repaired, as necessary.

Overall, the Site ECs are not expected to be vulnerable to the effects of global climate change, including severe weather and flooding events.

## **6.2 GREEN REMEDIATION EVALUATION**

NYSDEC's DER-31 Green Remediation requires that green remediation concepts and techniques be considered during stages of the remedial program including Site management, with the goal of improving the sustainability of the cleanup and summarizing the net environmental benefit of implemented green technology. This section provides an

environmental footprint analysis of the remedy, as implemented at the time of this SMP. This section of the SMP also provides a summary of any green remediation evaluations to be completed for the Site during Site management, and as reported in the PRRs.

Wastes which may be generated during Site management will be limited to spent granular activated carbon in drums and will be appropriately disposed of at an off-site facility. Recycling or regenerating the carbon will be evaluated for feasibility. Single use sampling equipment to be used includes 1/4-inch polyethylene tubing that will be used to collect soil vapor samples from the vacuum monitoring points. Disposable, single-use equipment will be used only as necessary.

The SSDS will have a 10.0 horsepower, three-phase, 208-volt blower and the SVE system will have a 15.0 horsepower, three-phase, 208-volt blower. The effluent discharge for both the SVE system and SSDS will be monitored in accordance with the schedule and protocols outlined in this SMP.

The SVE system will include treatment of the system effluent to reduce emissions. Based upon sub-slab concentrations and system configuration, the SSDS will not require pre-treatment prior to discharge. When equipment is replaced or added to these systems, the deliveries will be conducted using trucks or vans. Efforts will be made to include as much necessary equipment in a single delivery to reduce the number of trips these vehicles are required to make to the Site. For routine inspections when personnel and handheld equipment are necessary, inspectors will take public transport to the site, if practical. If system handling can be performed by on-site personnel with correspondence with the PE, then these approaches will be enacted to reduce the need for transportation.

The annual Green Remediation Evaluation calculations for the activities included in this SMP are detailed in **Appendix L**.

#### *6.2.1 Timing of Green Remediation Evaluations*

For major remedial system components, green remediation evaluations and corresponding modifications will be undertaken as part of a formal Remedial System Optimization (RSO), or at a time that the NYSDEC project manager feels appropriate, (e.g. during significant maintenance events or in conjunction with storm recovery activities).

Modifications resulting from green remediation evaluations will be routinely implemented and scheduled to occur during planned/routine operation and maintenance activities after approval from the DER project manager. Reporting of these modifications will be presented in the PRR.

#### *6.2.2 Remedial Systems*

Remedial systems will be operated properly considering the current Site conditions to conserve materials and resources to the greatest extent possible. Consideration will be given to operating rates and use of reagents and consumables. Spent materials will be sent for recycling, as appropriate.

The SVE system and SSDS will not be discontinued without the approval of NYSDEC and NYSDOH. In the event that approval is granted to discontinue the active use of the SSDS, it may be converted to a passive system and the electric blower will be replaced with a wind turbine.

#### *6.2.3 Frequency of System Checks, Sampling and Other Periodic Activities*

Transportation to and from the Site, use of consumables in relation to visiting the Site in order to conduct system checks and/or collect samples, and shipping samples to a laboratory for analyses have direct and/or inherent energy costs. The schedule and/or means of these periodic activities have been prepared so that these tasks can be accomplished in a manner that does not impact remedy protectiveness but reduces expenditure of energy or resources.

The SSDS and SVE System will have remote telemetry to determine if the systems are operational, which will reduce the number of visits to the Site. When visits to the Site are required, mass transit and carpooling will be considered to reduce vehicular traffic and emissions. After the first PRR time period (16 months), Site visits will be limited to an annual event. Samples collected from the Site will be picked up by a courier service for the laboratory that collects samples from multiple Sites per day in the region and will be driven to a nearby laboratory as opposed to being shipped via air freight.

#### 6.2.4 *Metrics and Reporting*

As discussed in Section 7.0 and as shown in **Appendix K** – Site Management Forms, and in **Appendix L** – Green Remediation Evaluation Calculations; information on energy usage, solid waste generation, transportation and shipping, water usage and land use and ecosystems will be recorded to facilitate and document consistent implementation of green remediation during Site management and to identify corresponding benefits. A set of metrics has been developed and will be evaluated over time to ensure that green remediation actions are achieving the desired results. The flow rate of the SSDS and SVE system blowers will be recorded which can be used to estimate energy usage. Transportation methods and/or mileage to and from the Site for Site inspections will also be recorded.

#### 6.2.5 *Remedial System Optimization*

A Remedial System Optimization (RSO) study will be conducted if the NYSDEC project manager or the remedial party requests in writing that an in-depth evaluation of the remedy is needed. An RSO may be appropriate if the following occur:

- The remedial actions have not met or are not expected to meet RAOs in the time frame estimated in the Decision Document;
- The management and operation of the remedial system is exceeding the estimated costs;
- The remedial system is not performing as expected or as designed;
- Previously unidentified source material may be suspected;
- Plume shift has potentially occurred;
- Site conditions change due to development, change of use, change in groundwater use, etc.;
- There is an anticipated transfer of the Site management to another remedial party or agency; and
- A new and applicable remedial technology becomes available.

An RSO will provide a critique of a site's conceptual model, give a summary of past performance, document current cleanup practices, summarize progress made toward the site's cleanup goals, gather additional performance or media specific data and

information and provide recommendations for improvements to enhance the ability of the present system to reach RAOs or to provide a basis for changing the remedial strategy.

The RSO study will focus on overall site cleanup strategy, process optimization and management with the intent of identifying impediments to cleanup and improvements to Site operations to increase efficiency, cost effectiveness and remedial time frames. Green remediation technology and principals are to be considered when performing the RSO.

## 7.0 REPORTING REQUIREMENTS

### 7.1 SITE MANAGEMENT REPORTS

Site management inspection, maintenance, and monitoring events will be recorded on the appropriate Site management forms provided in **Appendix K**. These forms are subject to NYSDEC revision. Site management inspection, maintenance, and monitoring events will be conducted by a Professional Engineer (PE) who is licensed and registered in New York State or a qualified person who directly reports to a PE who is licensed and registered in New York State.

Applicable inspection forms and other records, including media sampling data and system maintenance reports, generated for the Site during the reporting period will be provided in electronic format to the NYSDEC in accordance with the requirements of **Table 8** and summarized in the Periodic Review Report.

**Table 8: Schedule of Interim Monitoring/Inspection Reports**

Task/Report	Reporting Frequency*
Periodic Review Report	16 Months following the issuance of the COC, then Annually

\* The frequency of events will be conducted as specified until otherwise approved by the NYSDEC project manager.

PRRs will include, at a minimum:

- Date of event or reporting period;
- Name, company, and position of person(s) conducting monitoring/inspection activities;
- Description of the activities performed;
- Where appropriate, color photographs or sketches showing the approximate location of problems or incidents noted (included either on the checklist/form or on an attached sheet);
- Type of samples collected (e.g., sub-slab vapor, indoor air, outdoor air);
- Copies of field forms completed (e.g., well sampling logs, chain-of-custody documentation);
- Sampling results in comparison to appropriate standards/criteria;

- A figure illustrating sample type and sampling locations;
- Copies of laboratory data sheets and the required laboratory data deliverables required for points sampled (to be submitted electronically in the NYSDEC-identified format);
- Observations, conclusions, or recommendations; and
- A determination as to whether contaminant conditions have changed since the last reporting event.

Routine maintenance event reporting forms will include, at a minimum:

- Date of event;
- Name, company, and position of person(s) conducting maintenance activities;
- Description of maintenance activities performed;
- Modifications to the system;
- Where appropriate, color photographs or sketches showing the approximate location of problems or incidents noted (included either on the checklist/form or on an attached sheet); and
- Other documentation such as copies of invoices for maintenance work, receipts for replacement equipment, etc., (attached to the checklist/form).

Non-routine maintenance event reporting forms will include, at a minimum:

- Date of event;
- Name, company, and position of person(s) conducting non-routine maintenance/repair activities;
- Description of non-routine activities performed;
- Where appropriate, color photographs or sketches showing the approximate location of problems or incidents (included either on the form or on an attached sheet); and
- Other documentation such as copies of invoices for repair work, receipts for replacement equipment, etc. (attached to the checklist/form).

Data will be reported in digital format as determined by the NYSDEC. Currently, data is to be supplied electronically and submitted to the NYSDEC EQuIS™ database in accordance with the requirements found at this link:

<http://www.dec.ny.gov/chemical/62440.html>.

## 7.2 PERIODIC REVIEW REPORT

A Periodic Review Report (PRR) will be submitted to the NYSDEC project manager beginning sixteen (16) months after the Certificate of Completion is issued. After submittal of the initial PRR, the next PRR shall be submitted annually to the NYSDEC project manager or at another frequency as may be required by the NYSDEC project manager. If the Site is subdivided into separate parcels with different ownership, a single PRR will be prepared that addresses the Site described in **Appendix A** - Environmental Easement. The report will be prepared in accordance with NYSDEC's DER-10 and submitted within 30 days of the end of each certification period. Media sampling results will also be incorporated into the PRR. The report will include:

- Identification, assessment, and certification of ECs/ICs required by the remedy for the Site.
- Results of the required annual Site inspections, fire inspections, and severe condition inspections, if applicable.
- Description of changes of use, import of materials, or excavation that occurred during the certifying period.
- Applicable Site management forms and other records generated for the Site during the reporting period in the NYSDEC-approved electronic format, if not previously submitted.
- Identification of wastes generated during the reporting period, along with waste characterization data, manifests, and disposal documentation.
- A summary of discharge monitoring data and/or information generated during the reporting period, with comments and conclusions.
- Data summary tables and graphical representations of contaminants of concern by media (groundwater, soil vapor, etc.), which include a listing of compounds analyzed, along with the applicable standards, with exceedances highlighted. These tables and figures will include a presentation of past data as part of an evaluation of contaminant concentration trends, including but not limited to:
  - Trend monitoring graphs depicting system influent analytical data on a per event and cumulative basis;
  - O&M data summary tables;
- Results of analyses, copies of laboratory data sheets, and the required laboratory data deliverables for samples collected during the reporting period will be submitted in digital format as determined by the NYSDEC. Currently, data is supplied electronically and submitted to the NYSDEC EQUIS™ database in



accordance with the requirements found at this link:  
<http://www.dec.ny.gov/chemical/62440.html>.

- A Site evaluation, which includes the following:
  - The compliance of the remedy with the requirements of the Site-specific Decision Document;
  - The operation and the effectiveness of treatment units, etc., including identification of needed repairs or modifications;
  - New conclusions or observations regarding Site contamination based on inspections or data generated by the Monitoring and Sampling Plan for the media being monitored;
  - Recommendations regarding necessary changes to the remedy and/or Monitoring and Sampling Plan;
  - An update to the climate change vulnerability assessment if Site or external conditions have changed since the previous assessment, and recommendations to address vulnerabilities.
  - A summary of the Green Remediation evaluation, including a quantitative and qualitative overview of a site's environmental impacts and recommendations to improve the remedy's environmental footprint. The PRR will include the completed Summary of Green Remediation Metrics form provided in **Appendix L**.
  - An evaluation of trends in contaminant levels in the affected media to determine if the remedy continues to be effective in achieving remedial goals as specified by the Decision Document; and
  - The overall performance and effectiveness of the remedy.
- A performance summary for treatment systems at the Site during the calendar year, including information such as:
  - The number of days the system operated for the reporting period;
  - The average, high, and low flows per day;
  - The contaminant mass removed and the cost per pound of mass removed during the certification period and during the life of the treatment system;
  - A description of breakdowns and/or repairs along with an explanation for a significant downtime;
  - A description of the resolution of performance problems;
  - Alarm conditions;
  - Trends in equipment failure;

- A summary of the performance, effluent and/or effectiveness monitoring; and
- Comments, conclusions, and recommendations based on data evaluation. Recommendations must address how receptors would be impacted. Recommendations can include:
  - Proposals to address efficiency and costs such as: instituting remote operation, system changes to decrease maintenance costs and downtime, and system changes to decrease energy use; and
  - Proposals to modify or shut down a treatment system due to remediation completion, system performance or changed conditions. System shutdowns are addressed in Section 6.4 of DER-10.

### *7.2.1 Certification of Institutional and Engineering Controls*

Following the last inspection of the reporting period, a Professional Engineer licensed to practice and registered in New York State will prepare, and include in the PRR, the following certification as per the requirements of NYSDEC DER-10:

*“For each institutional or engineering control identified for the Site, I certify that the following statements are true:*

- *The inspection of the Site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under my direction;*
- *The institutional control and/or engineering control employed at this Site is unchanged from the date the control was put in place, or last approved by the Department;*
- *Nothing has occurred that would impair the ability of the control to protect the public health and environment;*
- *Nothing has occurred that would constitute a violation or failure to comply with Site management plan for this control;*
- *Access to the Site will continue to be provided to the Department to evaluate the remedy, including access to evaluate the continued maintenance of this control;*
- *If a financial assurance mechanism is required under the oversight document for the Site, the mechanism remains valid and sufficient for the intended purpose under the document;*
- *Use of the Site is compliant with the environmental easement;*
- *The engineering control systems are performing as designed and are effective;*

- *To the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the Site remedial program and generally accepted engineering practices; and*
- *The information presented in this report is accurate and complete.*

*I certify that information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class “A” misdemeanor, pursuant to Section 210.45 of the Penal Law. I, NAME, of ADDRESS, am certifying as Remedial Party’s Designated Site Representative.*

*I certify that the New York State Education Department has granted a Certificate of Authorization to provide Professional Engineering services to the firm that prepared this Periodic Review Report.”*

The signed certification will be included in the PRR.

The PRR will be submitted, in electronic format, to the NYSDEC project manager and the NYSDOH project manager. The PRR may also need to be submitted in hard-copy format if requested by the NYSDEC project manager.

### **7.3 CORRECTIVE MEASURES WORK PLAN**

If a component of the remedy is found to have failed, or if the periodic certification cannot be provided due to the failure of an institutional or engineering control, or failure to conduct Site management activities, a Corrective Measures Work Plan will be submitted to the NYSDEC project manager for approval. This plan will explain the failure and provide the details and schedule for performing work necessary to correct the failure. Unless an emergency condition exists, no work will be performed pursuant to the Corrective Measures Work Plan until it has been approved by the NYSDEC project manager.

### **7.4 REMEDIAL SYSTEM OPTIMIZATION REPORT**

If an RSO is to be performed (see Section 6.3), upon completion of an RSO, an RSO report must be submitted to the NYSDEC project manager for approval. A general outline for the RSO report is provided in **Appendix M**. The RSO report will document the research/ investigation and data gathering that was conducted, evaluate the results and facts obtained, present a revised conceptual Site model and present recommendations. RSO

recommendations are to be implemented upon approval from the NYSDEC. Additional work plans, design documents, HASPs etc., may still be required to implement the recommendations, based upon the actions that need to be taken. A final engineering report and update to the SMP may also be required.

The RSO report will be submitted, in electronic format, to the NYSDEC project manager and the NYSDOH project manager.

## 8.0 REFERENCES

NYSDEC, Division of Environmental Restoration, 6 NYCRR Part 375 Subpart 6, Remedial Program Soil Cleanup Objectives, December 14, 2006.

NYSDEC, Division of Environmental Remediation, December 2002, DER-10, Technical Guidance for Site Investigation and Remediation, May 3, 2010.

NYSDEC, 1998. Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1. June 1998 (April 2000 addendum).

Associated Environmental Services, 1065 Atlantic Ave Phase II ESA, March 2016.

GCI, 1045 Atlantic Ave Phase I ESA, May 2004.

GCI, 1045 Atlantic Ave Phase II ESA, August 2004.

GCI, 1045 Atlantic Ave Tank Abandonment Report, January 2005.

GCI, 1045 Atlantic Ave Phase II ESA, August 2014.

NYSDEC, Brownfield Cleanup Agreement, Atlantic Brooklyn Project (C224305), July 8, 2020.

NYSDEC, Amended Brownfield Cleanup Agreement, Atlantic Brooklyn Project (C224305), June 1, 2021.

NYSDEC, Remedial Investigation Approval Letter, Atlantic Brooklyn Project (C224305) August 13, 2021.

NYSDEC, Division of Environmental Remediation, Guidelines for Sampling and Analysis of PFAS under NYSDEC's Part 375 Remedial Programs, June 2021.

NYSDOH, Guidance for Evaluating Soil Vapor Intrusion in the State of New York, October 2006.

PWGC, 1045 Atlantic Ave Phase I ESA, March 2019.

PWGC, 1045 Atlantic Ave Phase II ESA, April 2019.

PWGC, 1053,1057,1059, and 1065 Atlantic Ave Phase I, April 2019.

PWGC, 1053,1057,1059, and 1065 Atlantic Ave Phase II, April 2019.

PWGC, 1061 to 1063 Atlantic Ave Phase I, August 2020.

PWGC, 1061 to 1063 Atlantic Ave Phase II, September 2020.

PWGC, Remedial Investigation Work Plan, Atlantic Brooklyn Project (C224305), August 2021.

PWGC, Remedial Investigation Report, Atlantic Brooklyn Project (C224305), March 2022.

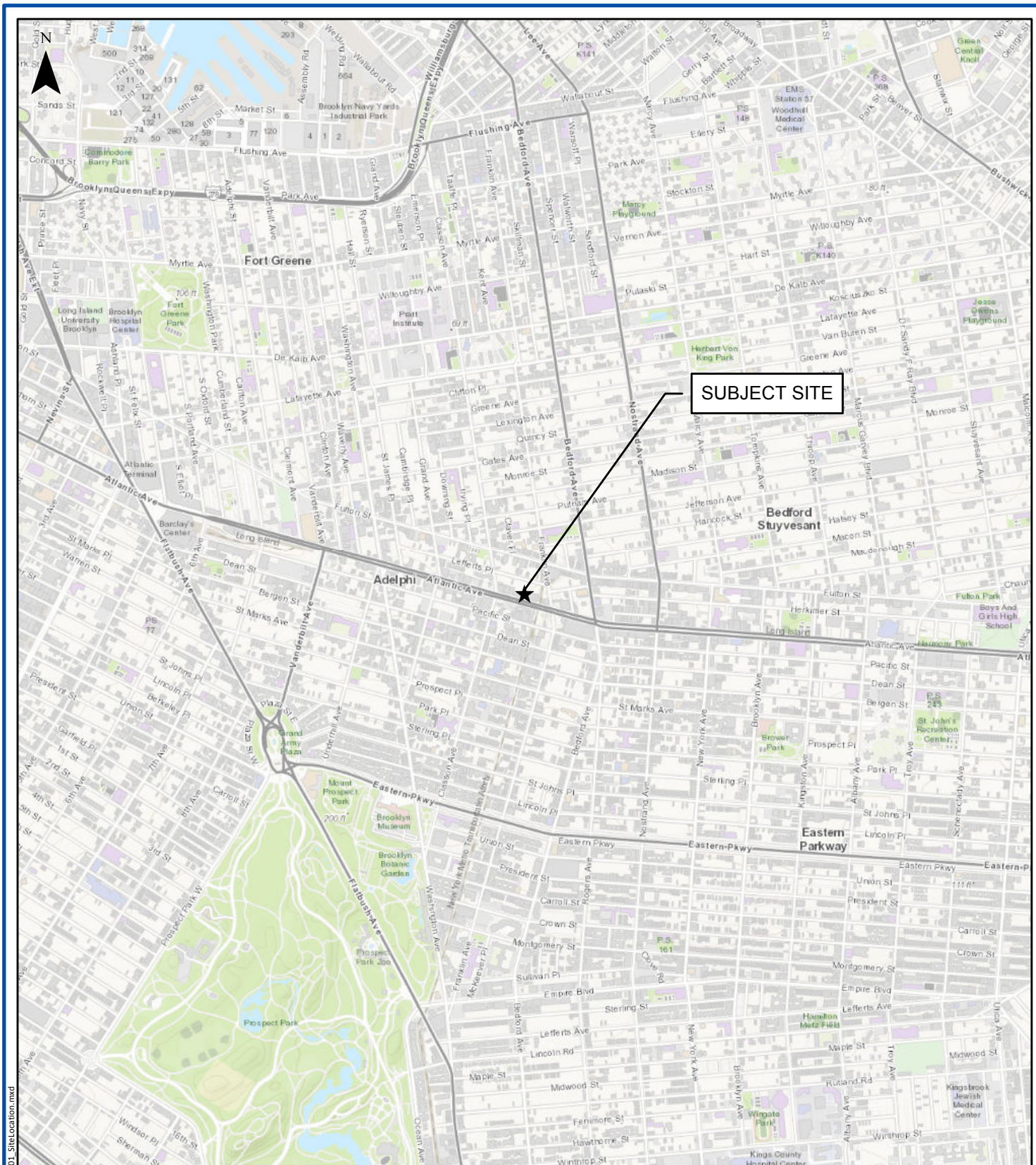
PWGC, Supplemental Remedial Investigation Work Plan, Atlantic Brooklyn Project (C224305), August 2022.

PWGC, Supplemental Remedial Investigation Report, Atlantic Brooklyn Project (C224305), May 2023.

USEPA, Standard Operating Procedure SOP 2042, Soil Gas Sampling.

USEPA, Low Stress (Low Flow) Purging and Sampling Procedure for The Collection of Groundwater Samples from Monitoring Wells, September 2017.

## **FIGURES**



## SITE LOCATION

1045 - 1065 Atlantic Avenue  
Brooklyn, NY

Atlantic Brooklyn  
Project  
BCP Site  
#C224305

Project:	TOT1903
Date:	2/11/2019
Designed by:	HRM
Drawn by:	TS
Approved by:	HRM
Figure No:	1



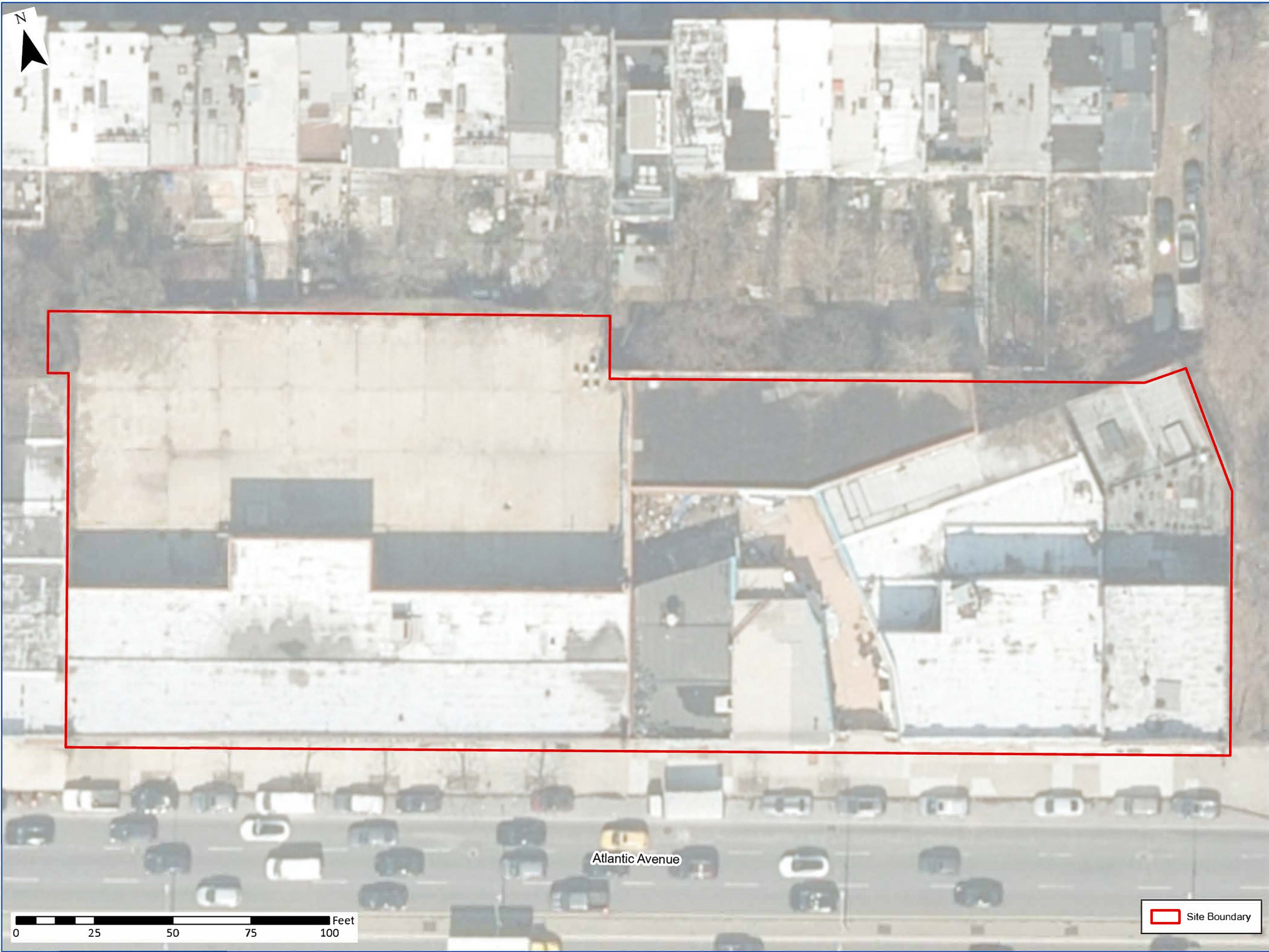
**PWGC**  
CLIENT DRIVEN SOLUTIONS

P.W. Grosser Consulting Engineer & Hydrogeologist, PC

630 Johnson Ave., Suite 7  
Bohemia, NY 11716  
Ph: 631-589-6353 • Fax: 631-589-8705  
pwgc.info@pwgros.com

0 1/4 1/2 3/4 1 Miles





P.W. Grosser Consulting Engineer & Hydrogeologist, PC

630 Johnson Ave., Suite 7  
Bohemia, NY 11716  
Ph: 631-589-6353 • Fax: 631-589-8705  
pwgc.info@pwgros.com

UNAUTHORIZED ALTERATION OR ADDITION TO THIS  
DRAWING AND RELATED DOCUMENTS IS A VIOLATION  
OF SEC. 7209 OF THE N.Y.S. EDUCATION LAW

DRAWING PREPARED FOR:

1065 Atlantic Avenue LLC  
Atlantic Brooklyn Project  
BCP Site #C224305


REVISION	DATE	INITIAL	COMMENTS
----------	------	---------	----------

DRAWING INFORMATION:			
Project:	TOT1903	Designed by:	JL
Date:	9/26/2023	Drawn by:	JM
Scale:	AS SHOWN	Approved by:	JL

### Site Plan

1045 - 1065 Atlantic Avenue  
Brooklyn, NY

FIGURE NO:

2







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DRAWING PREPARED FOR:

1065 Atlantic Avenue LLC  
Atlantic Brooklyn Project  
BCP Site #C224305

REVISION	DATE	INITIAL	COMMENTS

DRAWING INFORMATION:

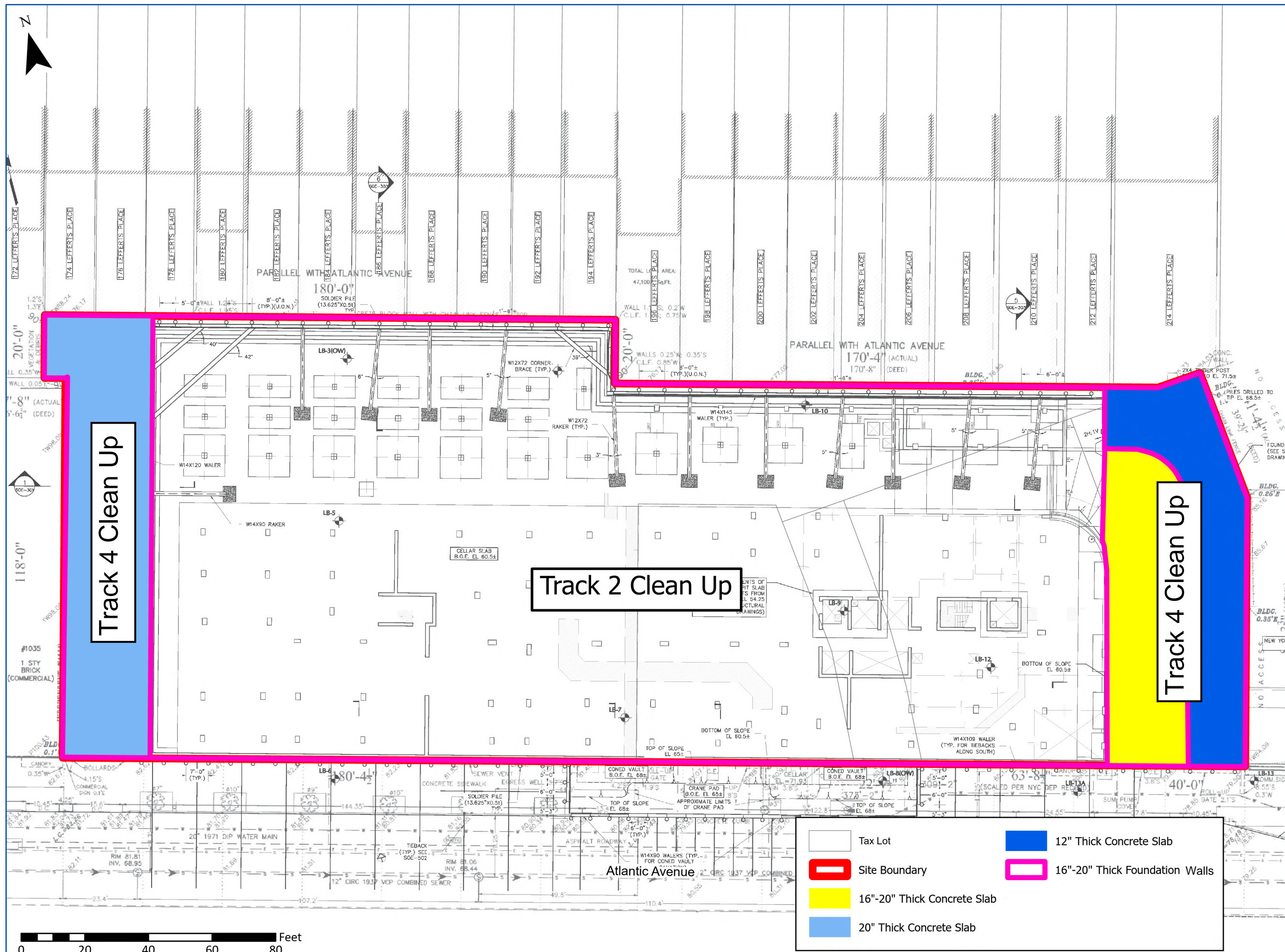
Project:	TOT1903	Designed by:	RM
Date:	12/14/2023	Drawn by:	AM
Scale:	AS SHOWN	Approved by:	RM

## Site Cover System Locations and Clean Up Tracks

1045 - 1065 Atlantic Avenue  
Brooklyn, NY

FIGURE NO:

4







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OF SEC. 7209 OF THE N.Y.S. EDUCATION LAW

DRAWING PREPARED FOR:

1065 Atlantic Avenue LLC  
42-09 235th Street  
Douglaston, New York 10363

REVISION	DATE	INITIAL	COMMENTS

DRAWING INFORMATION:

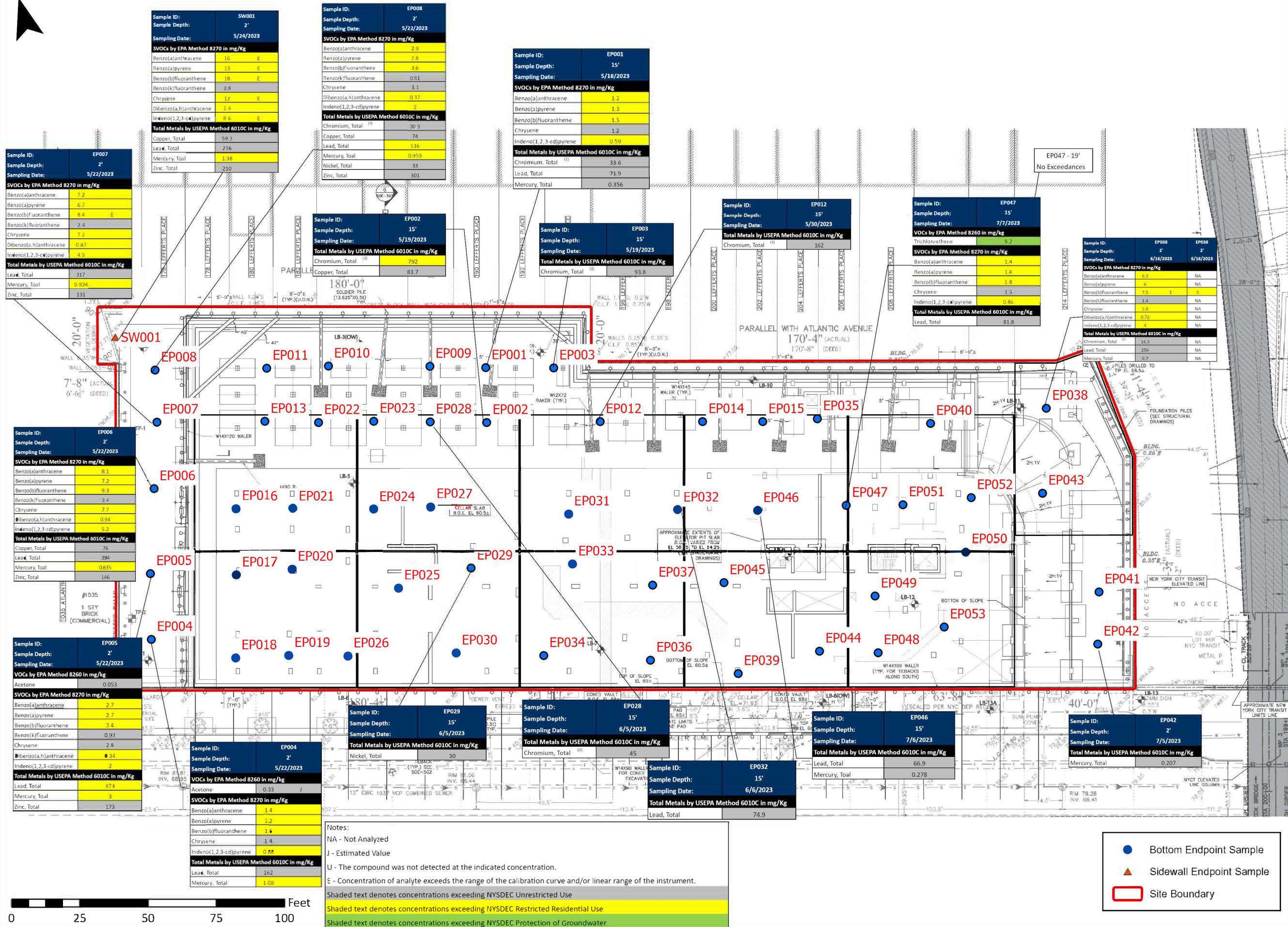
Project:	TOT1903	Designed by:	RM
Date:	10/8/2024	Drawn by:	AM
Scale:	AS SHOWN	Approved by:	RM/JL

## Endpoint Sample Locations and Remaining Contamination

1045 - 1065 Atlantic Avenue  
Brooklyn, NY

FIGURE NO:

5







SV011 (21')	
Sampling Date:	8/15/2022
VOCs in Air	
1,1,1-Trichloroethane	18.6
1,2,4-Trimethylbenzene	8.36
2-Butanone	233
2-Hexanone	91.3
4-Methyl-2-pentanone	15.3
Acetone	760
Benzene	51.6
Carbon disulfide	7.95
Chloroform	9.97
Cyclohexane	7.03
Ethylbenzene	28.8
Isopropanol	31.8 B
n-Heptane	65.5
n-Hexane	85.1
o-Xylene	29.5
p/m-Xylene	96.8
p-Ethyltoluene	10
Propylene	241
Tetrachloroethene	449
Toluene	318
Trichloroethene	6030

SV012 (21')	
Sampling Date:	8/15/2022
VOCs in Air	
1,2,4-Trimethylbenzene	8.3
2-Butanone	106
2-Hexanone	44.3
4-Methyl-2-pentanone	4.15
Acetone	1400
Benzene	31.6
Carbon disulfide	6.05
Chloroform	80
Cyclohexane	9.59
Ethylbenzene	16.5
Isopropanol	18.5 B
n-Heptane	29.4
n-Hexane	52.4
o-Xylene	20.2
p/m-Xylene	52.1
p-Ethyltoluene	7.06
Propylene	211
Tetrachloroethene	227
Toluene	189
Trichloroethene	1750

SV013 (21')	
Sampling Date:	8/15/2022
VOCs in Air	
2-Butanone	108
2-Hexanone	30.1
Acetone	629
Benzene	24.6
Carbon disulfide	13.5
cis-1,2-Dichloroethene	11.9
Isopropanol	57.5 B
n-Heptane	28.8
n-Hexane	44.8
o-Xylene	14.5
p/m-Xylene	39.2
Propylene	294
Tetrachloroethene	1840
Toluene	122
Trichloroethene	15300

SV014 (21')	
Sampling Date:	8/15/2022
VOCs in Air	
2-Butanone	136
2-Hexanone	33
Acetone	327
Benzene	24.6
Chloroform	25.7
cis-1,2-Dichloroethene	23.6
Isopropanol	62.9 B
n-Heptane	18.7
n-Hexane	18.5
o-Xylene	16.7
p/m-Xylene	45.7
Propylene	56.1
Tetrachloroethene	980
Toluene	169
Trichloroethene	131000

SV017 (21')	
Sampling Date:	8/15/2022
VOCs in Air	
2-Butanone	25.8
Acetone	77.5
Benzene	21.5
Carbon disulfide	12
Ethylbenzene	12.4
Isopropanol	28.5 B
n-Heptane	15.2
n-Hexane	17.8
o-Xylene	12.4
p/m-Xylene	38
Propylene	74.9
Tetrachloroethene	11.4
Toluene	155
Trichloroethene	2390

SV018 (21')	
Sampling Date:	8/15/2022
VOCs in Air	
2-Butanone	59.3
Acetone	1340
Benzene	27.7
Carbon disulfide	7.37
Carbon tetrachloride	3.97
Dichlorodifluoromethane	9.36
Ethylbenzene	11.6
Isopropanol	32.2 B
n-Heptane	15.5
n-Hexane	23.9
o-Xylene	11.6
p/m-Xylene	32.9
Propylene	126
Tetrachloroethene	16
Toluene	143
Trichloroethene	2090

SS010 (subslab)	
Sampling Date:	8/19/2021
VOCs in Air	
1,2,4-Trimethylbenzene	8.5
1,3,5-Trimethylbenzene	2.62
1,3-Butadiene	0.489
2,2,4-Trimethylpentane	14.7
2-Butanone	4.81
4-Ethyltoluene	2.46
Acetone	44.2
Benzene	4.44
Chloroform	3.61
Chloromethane	0.63
Cyclohexane	2.94
Dichlorodifluoromethane	2.53
Ethylbenzene	9.95
Heptane	6.8
Isopropanol	1.8
Methylene chloride	1.98
n-Hexane	8.46
o-Xylene	13.7
p/m-Xylene	40
Styrene	1.64
Tertiary butyl Alcohol	8.49
Tetrachloroethene	70.5
Tetrahydrofuran	2.07
Toluene	110
Trichloroethene	82.2
Trichlorofluoromethane	1.28

SS-004 (subslab)	
Sampling Date:	3/22/2019
VOCs in Air	
Tetrachloroethene	.492
Trichloroethene	66.1

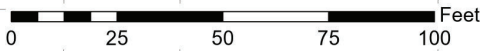
SS011 (subslab)	
Sampling Date:	8/19/2021
VOCs in Air	
1,2,4-Trimethylbenzene	9.68
1,3,5-Trimethylbenzene	2.6
1,3-Dichlorobenzene	36.4
2,2,4-Trimethylpentane	5.79
2-Butanone	2.01
4-Ethyltoluene	2.49
Acetone	44.7
Benzene	0.965
Cyclohexane	0.788
Dichlorodifluoromethane	2.25
Ethylbenzene	6.6
Heptane	3.61
n-Hexane	2.61
o-Xylene	12.2
p/m-Xylene	38.9
Styrene	3.85
Tertiary butyl Alcohol	10
Tetrachloroethene	30.8
Tetrahydrofuran	2.06
Toluene	25.9
Trichlorofluoromethane	1.4

SS015 (subslab)	
Sampling Date:	8/19/2021
VOCs in Air	
1,1,1-Trichloroethane	111
1,2,4-Trimethylbenzene	12.6
1,3-Dichlorobenzene	23.4
Acetone	23.7
Ethylbenzene	9.95
Heptane	5.08
n-Hexane	4.48
o-Xylene	14.8
p/m-Xylene	47.3
Tertiary butyl Alcohol	9.09
Tetrachloroethene	63.8
Toluene	35.5
Trichloroethene	1,810

SV016 (21')	
Sampling Date:	8/15/2022
VOCs in Air	
1,1-Dichloroethene	29.1
2-Butanone	253
Acetone	1720
Benzene	70.2
Chloroform	210
cis-1,2-Dichloroethene	3250
Isopropanol	124 B
n-Hexane	51.7
Propylene	328
Tetrachloroethene	3630
Toluene	146
trans-1,2-Dichloroethene	125
Trichloroethene	89900

SV015 (21')	
Sampling Date:	8/15/2022
VOCs in Air	
Acetone	645
cis-1,2-Dichloroethene	3040
Isopropanol	374 B
Propylene	754
Tetrachloroethene	1610
Trichloroethene	194000

- Notes:
- Result units are in ug/m3
  - Only detectable concentrations are shown on the figure.
  - B - The analyte was detected above the reporting limit in the associated method blank.



- Site Boundary
- Tax Lot Boundary
- Historical Sample Locations
  - Phase II Sub-Slab Vapor Sample Location
  - RI Indoor Air Sample Location
  - SRI Soil Vapor Sample Location
  - Building

1065 Atlantic Avenue LLC  
Atlantic Brooklyn Project  
BCP Site #C224305

REVISION DATE INITIAL COMMENTS

DRAWING INFORMATION:

Project: TOT2201 Designed by: JL

Date: 7/31/2023 Drawn by: PH

Scale: AS SHOWN Approved by: JL

HISTORIC SOIL  
VAPOR SAMPLE  
ANALYTICAL RESULTS

1045 - 1065 ATLANTIC AVE  
BROOKLYN, NY

FIGURE NO:

6



MW010			
Sampling Date:		10/21/2021	11/7/2022
VOCs by USEPA Method 8260			
Chloroform	26	29.9	
Trichloroethene	11	3.77	
SVOCs by USEPA Method 8270 SIM			
Benzo(a)anthracene	0.02	J	NA
Dissolved Metals by USEPA Method 6010			
Chromium, Total	201	28.4	
Chromium, Hexavalent	NA	29	
Chromium, Trivalent	NA	10	U
Sodium	91,000	NA	

MW007		
Sampling Date:		10/19/2021
VOCs by USEPA Method 8260		
Chloroform	5.5	
SVOCs by USEPA Method 8270 SIM		
Benzo(b)fluoranthene	0.02	J
Benzo(k)fluoranthene	0.02	J
Indeno(1,2,3-cd)pyrene	0.03	J
Dissolved Metals by USEPA Method 6010		
Sodium	133,000	

MW001			
Sampling Date:		10/19/2021	11/7/2022
VOCs by USEPA Method 8260			
Chloroform	34	45.8	
Trichloroethene	4.9	5.56	
Dissolved Metals by USEPA Method 6010			
Sodium	63,500	NA	

MW004			
Sampling Date:		10/21/2021	11/7/2022
VOCs by USEPA Method 8260			
Chloroform	29	39.8	
Trichloroethene	20	5.11	
SVOCs by USEPA Method 8270 SIM			
Benzo(b)fluoranthene	0.02	J	NA
Benzo(k)fluoranthene	0.03	J	NA
Indeno(1,2,3-cd)pyrene	0.03	J	NA
Dissolved Metals by USEPA Method 6010			
Cadmium	5.59	3.33	U
Chromium, Total	106.5	36.8	
Chromium, Hexavalent	NA	33	
Chromium, Trivalent	NA	10	U
Sodium	103,000	NA	

MW009			
Sampling Date:		10/21/2021	11/7/2022
VOCs by USEPA Method 8260			
Chloroform	25	30.7	
Trichloroethene	12	3.9	
SVOCs by USEPA Method 8270 SIM			
Benzo(a)anthracene	1	NA	
Benzo(a)pyrene	1.1	NA	
Benzo(b)fluoranthene	1.5	NA	
Benzo(k)fluoranthene	0.49	NA	
Chrysene	0.96	NA	
Indeno(1,2,3-cd)pyrene	0.97	NA	
Dissolved Metals by USEPA Method 6010			
Sodium	107,000	NA	

MW003			
Sampling Date:		10/21/2021	11/7/2022
VOCs by USEPA Method 8260			
Chloroform	11	22.5	
Dissolved Metals by USEPA Method 6010			
Sodium	120,000	NA	

MW012	
Sampling Date:	10/22/2021
Dissolved Metals by USEPA Method 6010	
Sodium	102,000

GW001 (75-80')	
Sampling Date:	4/9/2019
Dissolved Metals by USEPA Method 6010	
Chloroform	19
Trichlorethene	42

MW013	
Sampling Date:	10/22/2021
Dissolved Metals by USEPA Method 6010	
Sodium	114,000

GW002 (75-80')	
Sampling Date:	4/9/2019
Dissolved Metals by USEPA Method 6010	
Trichloroethene	8.8

MW011	
Sampling Date:	10/19/2021
VOCs by USEPA Method 8260	
Chloroform	14
SVOCs by USEPA Method 8270 SIM	
Benzo(a)anthracene	0.02 J
Dissolved Metals by USEPA Method 6010	
Sodium	192,000

MW002	
Sampling Date:	10/21/2021
VOCs by USEPA Method 8260	
Chloroform	7.4
Dissolved Metals by USEPA Method 6010	
Sodium	127,000

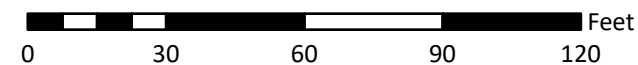
MW008			
Sampling Date:		10/21/2022	11/7/2022
VOCs by USEPA Method 8260			
Chloroform	29	31.2	
SVOCs by USEPA Method 8270 SIM			
Benzo(a)anthracene	0.03	J	NA
Benzo(b)fluoranthene	0.02	J	NA
Chrysene	0.02	J	NA
Indeno(1,2,3-cd)pyrene	0.01	J	NA
Dissolved Metals by USEPA Method 6010			
Sodium	93,100	NA	

MW005	
Sampling Date:	10/22/2021
SVOCs by USEPA Method 8270 SIM	
Benzo(a)anthracene	0.24
Benzo(a)pyrene	0.21
Benzo(b)fluoranthene	0.29
Benzo(ghi)perylene	0.14
Benzo(k)fluoranthene	0.08 J
Chrysene	0.2
Indeno(1,2,3-cd)pyrene	0.15
Dissolved Metals by USEPA Method 6010	
Sodium	226,000

▲ Monitoring Well Locations	□ Tax lot boundary
⊗ Drain Pit	▭ Site Boundary
● Drum (waste oil)	▭ AST
● Hydraulic Lift - active	▭ Former gasoline tank
○ Hydraulic Lift - inactive	▭ Dynamometer
● Historical Sample Locations	▭ Inspection Pit
◆ Groundwater Sample	▭ Sump
● Grab Sample	▭ Basement
● Soil Boring/ Groundwater Sample	▭ Building

**Notes:**  
NA indicates that the analyte was not analyzed  
Units are in µg/L.

Highlighted values indicate exceedance of the NYSDEC Guidance Value, June 2021.



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DRAWING PREPARED FOR:

REVISION DATE INITIAL COMMENTS

DRAWING INFORMATION:

Project:	TOT2201	Designed by:	JL
Date:	7/29/2024	Drawn by:	AM
Scale:	AS SHOWN	Approved by:	JL

## Groundwater Analytical Exceedances

1045 – 1065 Atlantic Ave  
Brooklyn, NY

FIGURE NO:

## **TABLES**



Table 2  
Soil VOC Analytical Data  
1045-1065 Atlantic Avenue, Brooklyn, New York

Sample Area:	Track 4 Area													
Sample ID:	CAS Number	NYSDEC Unrestricted Use SCOs (1)	NYSDEC Protection of Groundwater SCOs (2)	NYSDEC Restricted-Residential Use SCOs (3)	SW001 2' 5/24/2023 L2329121-02	EP004 2' 5/22/2023 L2328475-01	EP005 2' 5/22/2023 L2328475-02	EP006 2' 5/22/2023 L2328475-03	EP007 2' 5/22/2023 L2328475-04	EP008 2' 5/22/2023 L2328475-05	EP038 2' 6/16/2023 L2334612-01	EP041 2' 7/5/2023 L2338252-01	EP042 2' 7/5/2023 L2338252-02	EP043 2' 7/5/2023 L2338252-04
Sample Depth:														
Sampling Date:														
Lab Sample ID:														
Volatile Organic Compounds by EPA Method 8260 in mg/kg														
1,1,1,2-Tetrachloroethane	630-20-6	NS	-	NS	0.00055 U	0.027 U	0.00052 U	0.00048 U	0.00048 U	0.00053 U	0.00059 U	0.00067 U	0.0006 U	0.00044 U
1,1,1-Trichloroethane	71-55-6	0.68	-	100	0.00055 U	0.027 U	0.00052 U	0.00048 U	0.00048 U	0.00015 U	0.00059 U	0.00067 U	0.0006 U	0.00044 U
1,1,2,2-Tetrachloroethane	79-34-5	NS	-	NS	0.00055 U	0.027 U	0.00052 U	0.00048 U	0.00048 U	0.00053 U	0.00059 U	0.00067 U	0.0006 U	0.00044 U
1,1,2-Trichloroethane	79-00-5	NS	-	NS	0.0011 U	0.054 U	0.001 U	0.00096 U	0.00096 U	0.0011 U	0.0012 U	0.0013 U	0.0012 U	0.00089 U
1,1-Dichloroethane	75-34-3	0.27	-	26	0.0011 U	0.054 U	0.001 U	0.00096 U	0.00096 U	0.0011 U	0.0012 U	0.0013 U	0.0012 U	0.00089 U
1,1-Dichloroethene	75-35-4	0.33	-	100	0.0011 U	0.054 U	0.001 U	0.00096 U	0.00096 U	0.0011 U	0.0012 U	0.0013 U	0.0012 U	0.00089 U
1,1-Dichloropropene	563-58-6	NS	-	NS	0.00055 U	0.027 U	0.00052 U	0.00048 U	0.00048 U	0.00053 U	0.00059 U	0.00067 U	0.0006 U	0.00044 U
1,2,3-Trichlorobenzene	87-61-6	NS	-	NS	0.0022 U	0.11 U	0.0021 U	0.0019 U	0.0019 U	0.0021 U	0.0024 U	0.0027 U	0.0024 U	0.0018 U
1,2,3-Trichloropropane	96-18-4	NS	-	NS	0.0022 U	0.11 U	0.0021 U	0.0019 U	0.0019 U	0.0021 U	0.0024 U	0.0027 U	0.0024 U	0.0018 U
1,2,4,5-Tetramethylbenzene	95-93-2	NS	-	NS	0.0022 U	0.98	0.0035	0.0019 U	0.0019 U	0.0021 U	0.0024 U	0.0027 U	0.0024 U	0.0018 U
1,2,4-Trichlorobenzene	120-82-1	NS	-	NS	0.0022 U	0.11 U	0.0021 U	0.0019 U	0.0019 U	0.0021 U	0.0024 U	0.0027 U	0.0024 U	0.0018 U
1,2,4-Trimethylbenzene	95-63-6	3.6	-	52	0.0022 U	2.5	0.0094	0.0019 U	0.0019 U	0.0021 U	0.0024 U	0.0027 U	0.0024 U	0.0018 U
1,2-Dibromo-3-chloropropane	96-12-8	NS	-	NS	0.0033 U	0.16 U	0.0031 U	0.0029 U	0.0029 U	0.0032 U	0.0036 U	0.004 U	0.0036 U	0.0027 U
1,2-Dibromoethane	106-93-4	NS	-	NS	0.0011 U	0.054 U	0.001 U	0.00096 U	0.00096 U	0.0011 U	0.0012 U	0.0013 U	0.0012 U	0.00089 U
1,2-Dichlorobenzene	95-50-1	1.1	-	100	0.0022 U	0.11 U	0.0021 U	0.0019 U	0.0019 U	0.0021 U	0.0024 U	0.0027 U	0.0024 U	0.0018 U
1,2-Dichloroethane	107-06-2	0.02	-	3.1	0.0011 U	0.054 U	0.001 U	0.00096 U	0.00096 U	0.0011 U	0.0012 U	0.0013 U	0.0012 U	0.00089 U
1,2-Dichloroethene, Total	540-59-0	NS	-	NS	0.0011 U	0.054 U	0.001 U	0.00053 J	0.00041 J	0.0011 U	0.0012 U	0.0013 U	0.0012 U	0.00046 J
1,2-Dichloropropane	78-87-5	NS	-	NS	0.0011 U	0.054 U	0.001 U	0.00096 U	0.00096 U	0.0011 U	0.0012 U	0.0013 U	0.0012 U	0.00089 U
1,3,5-Trimethylbenzene	108-67-8	8.4	-	52	0.0022 U	0.91	0.0044	0.0019 U	0.0019 U	0.0021 U	0.0024 U	0.0027 U	0.0024 U	0.0018 U
1,3-Dichlorobenzene	541-73-1	2.4	-	49	0.0022 U	0.11 U	0.0021 U	0.0019 U	0.0019 U	0.0021 U	0.0024 U	0.0027 U	0.0024 U	0.0018 U
1,3-Dichloropropane	142-28-9	NS	-	NS	0.0022 U	0.11 U	0.0021 U	0.0019 U	0.0019 U	0.0021 U	0.0024 U	0.0027 U	0.0024 U	0.0018 U
1,3-Dichloropropene, Total	542-75-6	NS	-	NS	0.00055 U	0.027 U	0.00052 U	0.00048 U	0.00048 U	0.00053 U	0.00059 U	0.00067 U	0.0006 U	0.00044 U
1,4-Dichlorobenzene	106-46-7	1.8	-	13	0.0022 U	0.11 U	0.0021 U	0.0019 U	0.0019 U	0.0021 U	0.0024 U	0.0027 U	0.0024 U	0.0018 U
1,4-Dioxane	123-91-1	0.1	-	13	0.088 U	4.3 U	0.083 U	0.077 U	0.077 U	0.085 U	0.095 U	0.11 U	0.097 U	0.071 U
2,2-Dichloropropane	594-20-7	NS	-	NS	0.0022 U	0.11 U	0.0021 U	0.0019 U	0.0019 U	0.0021 U	0.0024 U	0.0027 U	0.0024 U	0.0018 U
2-Butanone	78-93-3	0.12	-	100	0.011 U	0.54 U	0.0048 J	0.0096 U	0.0096 U	0.011 U	0.012 U	0.013 U	0.012 U	0.0089 U
2-Hexanone	591-78-6	NS	-	NS	0.011 U	0.54 U	0.01 U	0.0096 U	0.0096 U	0.011 U	0.012 U	0.013 U	0.012 U	0.0089 U
4-Methyl-2-pentanone	108-10-1	NS	-	NS	0.011 U	0.54 U	0.01 U	0.0096 U	0.0096 U	0.011 U	0.012 U	0.013 U	0.012 U	0.0089 U
Acetone	67-64-1	0.05	-	100	0.011 U	0.33 J	0.053	0.0075 J	0.043	0.011 U	0.0093 J	0.0069 J	0.0076 J	0.0067 J
Acrylonitrile	107-13-1	NS	-	NS	0.0044 U	0.22 U	0.0041 U	0.0038 U	0.0038 U	0.0042 U	0.0047 U	0.0054 U	0.0048 U	0.0036 U
Benzene	71-43-2	0.06	-	4.8	0.0055 U	0.027 U	0.00052 U	0.00048 U	0.00048 U	0.00053 U	0.00059 U	0.00067 U	0.0006 U	0.00044 U
Bromobenzene	108-86-1	NS	-	NS	0.0022 U	0.11 U	0.0021 U	0.0019 U	0.0019 U	0.0021 U	0.0024 U	0.0027 U	0.0024 U	0.0018 U
Bromochloromethane	74-97-5	NS	-	NS	0.0022 U	0.11 U	0.0021 U	0.0019 U	0.0019 U	0.0021 U	0.0024 U	0.0027 U	0.0024 U	0.0018 U
Bromodichloromethane	75-27-4	NS	-	NS	0.00055 U	0.027 U	0.00052 U	0.00048 U	0.00048 U	0.00053 U	0.00059 U	0.00067 U	0.0006 U	0.00044 U
Bromoform	75-25-2	NS	-	NS	0.0044 U	0.22 U	0.0041 U	0.0038 U	0.0038 U	0.0042 U	0.0047 U	0.0054 U	0.0048 U	0.0036 U
Bromomethane	74-83-9	NS	-	NS	0.0022 U	0.11 U	0.0021 U	0.0019 U	0.0019 U	0.0021 U	0.0024 U	0.0027 U	0.0024 U	0.0018 U
Carbon disulfide	75-15-0	NS	-	NS	0.011 U	0.54 U	0.01 U	0.0096 U	0.0096 U	0.011 U	0.012 U	0.013 U	0.012 U	0.0089 U
Carbon tetrachloride	56-23-5	0.76	-	2.4	0.0011 U	0.054 U	0.001 U	0.00096 U	0.00096 U	0.0011 U	0.0012 U	0.0013 U	0.0012 U	0.00089 U
Chlorobenzene	108-90-7	1.1	-	100	0.0055 U	0.027 U	0.00052 U	0.00048 U	0.00048 U	0.00053 U	0.00059 U	0.00067 U	0.0006 U	0.00044 U
Chloroethane	75-00-3	NS	-	NS	0.0022 U	0.11 U	0.0021 U	0.0019 U	0.0019 U	0.0021 U	0.0024 U	0.0027 U	0.0024 U	0.0018 U
Chloroform	67-66-3	0.37	-	49	0.0016 U	0.081 U	0.00073 J	0.0014 U	0.0014 U	0.0016 U	0.0018 U	0.002 U	0.0018 U	0.0013 U
Chloromethane	74-87-3	NS	-	NS	0.0044 U	0.22 U	0.0041 U	0.0038 U	0.0038 U	0.0042 U	0.0047 U	0.0054 U	0.0048 U	0.0036 U
cis-1,2-Dichloroethene	156-59-2	0.25	-	100	0.0011 U	0.054 U	0.001 U	0.00029 J	0.00041 J	0.0011 U	0.0012 U	0.0013 U	0.0012 U	0.00046 J
cis-1,3-Dichloropropene	10061-01-5	NS	-	NS	0.00055 U	0.027 U	0.00052 U	0.00048 U	0.00048 U	0.00053 U	0.00059 U	0.00067 U	0.0006 U	0.00044 U
Dibromochloromethane	124-48-1	NS	-	NS	0.0011 U	0.054 U	0.001 U	0.00096 U	0.00096 U	0.0011 U	0.0012 U	0.0013 U	0.0012 U	0.00089 U
Dibromomethane	74-95-3	NS	-	NS	0.0022 U	0.11 U	0.0021 U	0.0019 U	0.0019 U	0.0021 U	0.0024 U	0.0027 U	0.0024 U	0.0018 U
Dichlorodifluoromethane	75-71-8	NS	-	NS	0.011 U	0.54 U	0.01 U	0.0096 U	0.0096 U	0.011 U	0.012 U	0.013 U	0.012 U	0.0089 U
Ethyl ether	60-29-7	NS	-	NS	0.0022 U	0.11 U	0.0021 U	0.0019 U	0.0019 U	0.0021 U	0.0024 U	0.0027 U	0.0024 U	0.0018 U
Ethylbenzene	100-41-4	1	-	41	0.0011 U	0.018 J	0.0011	0.00096 U	0.00096 U	0.0011 U	0.0012 U	0.0013 U	0.0012 U	0.00089 U
Hexachlorobutadiene	87-68-3	NS	-	NS	0.0044 U	0.22 U	0.0041 U	0.0038 U	0.0038 U	0.0042 U	0.0047 U	0.0054 U	0.0048 U	0.001 J
Isopropylbenzene	98-82-8	NS	-	NS	0.0011 U	0.048 J	0.00052 J	0.00096 U	0.00096 U	0.0011 U	0.0012 U	0.0013 U	0.0012 U	0.00089 U
Methyl tert butyl ether	1634-04-4	0.93	-	100	0.0022 U	0.11 U	0.0021 U	0.0019 U	0.0019 U	0.0021 U	0.0024 U	0.0027 U	0.0024 U	0.0018 U
Methylene chloride	75-09-2	0.05	-	100	0.0055 U	0.27 U	0.0052 U	0.0048 U	0.0048 U	0.0053 U	0.0059 U	0.0067 U	0.006 U	0.0044 U
n-Butylbenzene	104-51-8	12	-	100	0.0011 U	0.41	0.001	0.00096 U	0.00096 U	0.0011 U	0.0012 U	0.0013 U	0.0012 U	0.00089 U
n-Propylben														



Table 2  
Soil VOC Analytical Data  
1045-1065 Atlantic Avenue, Brooklyn, New York

Sample Area:					Track 2 Area																			
Sample ID:	CAS Number	NYSDEC Unrestricted Use SCOs (1)	NYSDEC Protection of Groundwater SCOs (2)	NYSDEC Restricted-Residential Use SCOs (3)	EP001 15' 5/18/2023 L23281803-01	EP002 15' 5/19/2023 L2328139-02	EP003 15' 5/19/2023 L2328139-01	EP009 15' 5/23/2023 L2328760-01	EP010 15' 5/24/2023 L2329121-01	EP011 15' 5/25/2023 L2329677-01	EP012 15' 5/30/2023 L2329999-01	EP013 15' 5/31/2023 L2330233-01	EP014 15' 5/31/2023 L2330233-02	EP015 15' 5/31/2023 L2330233-03	EP016 15' 5/31/2023 L2330233-04	EP017 15' 5/31/2023 L2330233-05	EP018 15' 5/31/2023 L2330233-06	EP019 15' 5/31/2023 L2330233-07						
Sample Depth:																								
Sampling Date:																								
Lab Sample ID:																								
Volatile Organic Compounds by EPA Method 8260 in mg/kg																								
1,1,1,2-Tetrachloroethane	630-20-6	NS	-	NS	0.00051 U	0.00045 U	0.00042 U	0.00054 U	0.00041 U	0.00047 U	0.00054 U	0.00054 U	0.00047 U	0.00049 U	0.00055 U	0.00052 U	0.00054 U	0.00037 U						
1,1,1-Trichloroethane	71-55-6	0.68	-	100	0.00051 U	0.00045 U	0.00042 U	0.00054 U	0.00041 U	0.00047 U	0.00054 U	0.00054 U	0.00047 U	0.00049 U	0.00055 U	0.00052 U	0.00054 U	0.00037 U						
1,1,2,2-Tetrachloroethane	79-34-5	NS	-	NS	0.00051 U	0.00045 U	0.00042 U	0.00054 U	0.00041 U	0.00047 U	0.00054 U	0.00054 U	0.00047 U	0.00049 U	0.00055 U	0.00052 U	0.00054 U	0.00037 U						
1,1,2-Trichloroethane	79-00-5	NS	-	NS	0.001 U	0.0009 U	0.00084 U	0.0011 U	0.00082 U	0.00095 U	0.0011 U	0.0011 U	0.00094 U	0.00097 U	0.0011 U	0.001 U	0.0011 U	0.00074 U						
1,1-Dichloroethane	75-34-3	0.27	-	26	0.001 U	0.0009 U	0.00084 U	0.0011 U	0.00082 U	0.00095 U	0.0011 U	0.0011 U	0.00094 U	0.00097 U	0.0011 U	0.001 U	0.0011 U	0.00074 U						
1,1-Dichloroethene	75-35-4	0.33	-	100	0.001 U	0.0009 U	0.00084 U	0.0011 U	0.00082 U	0.00095 U	0.0011 U	0.0011 U	0.00094 U	0.00097 U	0.0011 U	0.001 U	0.0011 U	0.00074 U						
1,1-Dichloropropene	563-58-6	NS	-	NS	0.00051 U	0.00045 U	0.00042 U	0.00054 U	0.00041 U	0.00047 U	0.00054 U	0.00054 U	0.00047 U	0.00049 U	0.00055 U	0.00052 U	0.00054 U	0.00037 U						
1,2,3-Trichlorobenzene	87-61-6	NS	-	NS	0.002 U	0.0018 U	0.0017 U	0.0022 U	0.0016 U	0.0019 U	0.0022 U	0.0021 U	0.0019 U	0.0019 U	0.0022 U	0.0021 U	0.0021 U	0.0015 U						
1,2,3-Trichloropropane	96-18-4	NS	-	NS	0.002 U	0.0018 U	0.0017 U	0.0022 U	0.0016 U	0.0019 U	0.0022 U	0.0021 U	0.0019 U	0.0019 U	0.0022 U	0.0021 U	0.0021 U	0.0015 U						
1,2,4,5-Tetramethylbenzene	95-93-2	NS	-	NS	0.002 U	0.0018 U	0.0017 U	0.00021 J	0.0016 U	0.0019 U	0.0022 U	0.0021 U	0.0019 U	0.00018 J	0.0022 U	0.0021 U	0.0021 U	0.0015 U						
1,2,4-Trichlorobenzene	120-82-1	NS	-	NS	0.002 U	0.0018 U	0.0017 U	0.0022 U	0.0016 U	0.0019 U	0.0022 U	0.0021 U	0.0019 U	0.0019 U	0.0022 U	0.0021 U	0.0021 U	0.0015 U						
1,2,4-Trimethylbenzene	95-63-6	3.6	-	52	0.002 U	0.0018 U	0.0017 U	0.0022 U	0.0016 U	0.0019 U	0.0022 U	0.0021 U	0.0019 U	0.0019 U	0.0022 U	0.0021 U	0.0021 U	0.0015 U						
1,2-Dibromo-3-chloropropane	96-12-8	NS	-	NS	0.0031 U	0.0027 U	0.0025 U	0.0032 U	0.0025 U	0.0028 U	0.0033 U	0.0032 U	0.0028 U	0.0029 U	0.0033 U	0.0031 U	0.0032 U	0.0022 U						
1,2-Dibromoethane	106-93-4	NS	-	NS	0.001 U	0.0009 U	0.00084 U	0.0011 U	0.00082 U	0.00095 U	0.0011 U	0.0011 U	0.00094 U	0.00097 U	0.0011 U	0.001 U	0.0011 U	0.00074 U						
1,2-Dichlorobenzene	95-50-1	1.1	-	100	0.002 U	0.0018 U	0.0017 U	0.0022 U	0.0016 U	0.0019 U	0.0022 U	0.0021 U	0.0019 U	0.0019 U	0.0022 U	0.0021 U	0.0021 U	0.0015 U						
1,2-Dichloroethane	107-06-2	0.02	-	3.1	0.001 U	0.0009 U	0.00084 U	0.0011 U	0.00082 U	0.00095 U	0.0011 U	0.0011 U	0.00094 U	0.00097 U	0.0011 U	0.001 U	0.0011 U	0.00074 U						
1,2-Dichloroethene, Total	540-59-0	NS	-	NS	0.001 U	0.0009 U	0.00084 U	0.0011 U	0.00082 U	0.00095 U	0.0011 U	0.0011 U	0.00094 U	0.00097 U	0.0011 U	0.001 U	0.0011 U	0.00074 U						
1,2-Dichloropropane	78-87-5	NS	-	NS	0.001 U	0.0009 U	0.00084 U	0.0011 U	0.00082 U	0.00095 U	0.0011 U	0.0011 U	0.00094 U	0.00097 U	0.0011 U	0.001 U	0.0011 U	0.00074 U						
1,3,5-Trimethylbenzene	108-67-8	8.4	-	52	0.002 U	0.0018 U	0.0017 U	0.0022 U	0.0016 U	0.0019 U	0.0022 U	0.0021 U	0.0019 U	0.0019 U	0.0022 U	0.0021 U	0.0021 U	0.0015 U						
1,3-Dichlorobenzene	541-73-1	2.4	-	49	0.002 U	0.0018 U	0.0017 U	0.0022 U	0.0016 U	0.0019 U	0.0022 U	0.0021 U	0.0019 U	0.0019 U	0.0022 U	0.0021 U	0.0021 U	0.0015 U						
1,3-Dichloropropane	142-28-9	NS	-	NS	0.002 U	0.0018 U	0.0017 U	0.0022 U	0.0016 U	0.0019 U	0.0022 U	0.0021 U	0.0019 U	0.0019 U	0.0022 U	0.0021 U	0.0021 U	0.0015 U						
1,3-Dichloropropene, Total	542-75-6	NS	-	NS	0.00051 U	0.00045 U	0.00042 U	0.00054 U	0.00041 U	0.00047 U	0.00054 U	0.00054 U	0.00047 U	0.00049 U	0.00055 U	0.00052 U	0.00054 U	0.00037 U						
1,4-Dichlorobenzene	106-46-7	1.8	-	13	0.002 U	0.0018 U	0.0017 U	0.0022 U	0.0016 U	0.0019 U	0.0022 U	0.0021 U	0.0019 U	0.0019 U	0.0022 U	0.0021 U	0.0021 U	0.0015 U						
1,4-Dioxane	123-91-1	0.1	-	13	0.082 U	0.072 U	0.067 U	0.086 U	0.066 U	0.076 U	0.087 U	0.086 U	0.075 U	0.078 U	0.088 U	0.083 U	0.086 U	0.06 U						
2,2-Dichloropropane	594-20-7	NS	-	NS	0.002 U	0.0018 U	0.0017 U	0.0022 U	0.0016 U	0.0019 U	0.0022 U	0.0021 U	0.0019 U	0.0019 U	0.0022 U	0.0021 U	0.0021 U	0.0015 U						
2-Butanone	78-93-3	0.12	-	100	0.01 U	0.009 U	0.0084 U	0.011 U	0.0082 U	0.0095 U	0.011 U	0.011 U	0.0094 U	0.0097 U	0.011 U	0.01 U	0.011 U	0.0074 U						
2-Hexanone	591-78-6	NS	-	NS	0.01 U	0.009 U	0.0084 U	0.011 U	0.0082 U	0.0095 U	0.011 U	0.011 U	0.0094 U	0.0097 U	0.011 U	0.01 U	0.011 U	0.0074 U						
4-Methyl-2-pentanone	108-10-1	NS	-	NS	0.01 U	0.009 U	0.0084 U	0.011 U	0.0082 U	0.0095 U	0.011 U	0.011 U	0.0094 U	0.0097 U	0.011 U	0.01 U	0.011 U	0.0074 U						
Acetone	67-64-1	0.05	-	100	0.01 U	0.009 U	0.0067 J	0.0061 J	0.0082 U	0.0095 U	0.0059 J	0.0052 J	0.0094 U	0.0097 U	0.013 U	0.012 U	0.0066 J	0.0074 U						
Acrylonitrile	107-13-1	NS	-	NS	0.0041 U	0.0036 U	0.0034 U	0.0043 U	0.0033 U	0.0038 U	0.0043 U	0.0043 U	0.0038 U	0.0039 U	0.0044 U	0.0042 U	0.0043 U	0.003 U						
Benzene	71-43-2	0.06	-	4.8	0.00051 U	0.00045 U	0.00042 U	0.00054 U	0.00041 U	0.00047 U	0.00054 U	0.00054 U	0.00047 U	0.00049 U	0.00055 U	0.00052 U	0.00054 U	0.00037 U						
Bromobenzene	108-86-1	NS	-	NS	0.002 U	0.0018 U	0.0017 U	0.0022 U	0.0016 U	0.0019 U	0.0022 U	0.0021 U	0.0019 U	0.0019 U	0.0022 U	0.0021 U	0.0021 U	0.0015 U						
Bromochloromethane	74-97-5	NS	-	NS	0.002 U	0.0018 U	0.0017 U	0.0022 U	0.0016 U	0.0019 U	0.0022 U	0.0021 U	0.0019 U	0.0019 U	0.0022 U	0.0021 U	0.0021 U	0.0015 U						
Bromodichloromethane	75-27-4	NS	-	NS	0.00051 U	0.00045 U	0.00042 U	0.00054 U	0.00041 U	0.00047 U	0.00054 U	0.00054 U	0.00047 U	0.00049 U	0.00055 U	0.00052 U	0.00054 U	0.00037 U						
Bromoform	75-25-2	NS	-	NS	0.0041 U	0.0036 U	0.0034 U	0.0043 U	0.0033 U	0.0038 U	0.0043 U	0.0043 U	0.0038 U	0.0039 U	0.0044 U	0.0042 U	0.0043 U	0.003 U						
Bromomethane	74-83-9	NS	-	NS	0.002 U	0.0018 U	0.0017 U	0.0022 U	0.0016 U	0.0019 U	0.0022 U	0.0021 U	0.0019 U	0.0019 U	0.0022 U	0.0021 U	0.0021 U	0.0015 U						
Carbon disulfide	75-15-0	NS	-	NS	0.01 U	0.009 U	0.0084 U	0.011 U	0.0082 U	0.0095 U	0.011 U	0.011 U	0.0094 U	0.0097 U	0.011 U	0.01 U	0.011 U	0.0074 U						
Carbon tetrachloride	56-23-5	0.76	-	2.4	0.001 U	0.0009 U	0.00084 U	0.0011 U	0.00082 U	0.00095 U	0.0011 U	0.0011 U	0											

Table 2  
Soil VOC Analytical Data  
1045-1065 Atlantic Avenue, Brooklyn, New York

Sample Area:		CAS Number	NYSDEC Unrestricted Use SCOs (1)	NYSDEC Protection of Groundwater SCOs (2)	NYSDEC Restricted- Residential Use SCOs (3)	Track 2 Area														
Sample ID:	Sample Depth:					EP020	EP021	EP022	EP023	EP024		EP025		EP026	EP027		EP028	EP029		
Sampling Date:	Lab Sample ID:					15'	15'	15'	15'	15'	21'	15'	21'	15'	15'	21'	15'	15'	21'	
						6/1/2023	6/5/2023	6/1/2023	6/5/2023	6/5/2023	6/13/2023	6/5/2023	6/14/2023	6/5/2023	6/5/2023	6/14/2023	6/5/2023	6/5/2023	6/14/2023	
						L2330617-03	L2331251-01	L2330617-01	L2331251-02	L2331251-03	L2333318-04	L2331251-04	L2333617-02	L2331251-05	L2331251-06	L2333617-03	L2331251-07	L2331251-09	L2333617-04	
Volatile Organic Compounds by EPA Method 8260 in mg/kg																				
1,1,1,2-Tetrachloroethane	630-20-6	NS	-	NS	0.00057	U	0.00042	U	0.00041	U	0.00051	U	0.00045	U	0.00044	U	0.00047	U	0.00044	U
1,1,1-Trichloroethane	71-55-6	0.68	-	100	0.00057	U	0.00042	U	0.00041	U	0.00051	U	0.00045	U	0.00044	U	0.00047	U	0.00044	U
1,1,2,2-Tetrachloroethane	79-34-5	NS	-	NS	0.00057	U	0.00042	U	0.00041	U	0.00051	U	0.00045	U	0.00044	U	0.00047	U	0.00044	U
1,1,2-Trichloroethane	79-00-5	NS	-	NS	0.0011	U	0.00085	U	0.00081	U	0.001	U	0.00091	U	0.00087	U	0.00094	U	0.0008	U
1,1-Dichloroethane	75-34-3	0.27	-	26	0.0011	U	0.00085	U	0.00081	U	0.001	U	0.00091	U	0.00087	U	0.00094	U	0.0008	U
1,1-Dichloroethene	75-35-4	0.33	-	100	0.0011	U	0.00085	U	0.00081	U	0.001	U	0.00091	U	0.00087	U	0.00094	U	0.0008	U
1,1-Dichloropropene	563-58-6	NS	-	NS	0.00057	U	0.00042	U	0.00041	U	0.00051	U	0.00045	U	0.00044	U	0.00047	U	0.00044	U
1,2,3-Trichlorobenzene	87-61-6	NS	-	NS	0.0023	U	0.0017	U	0.0016	U	0.002	U	0.0018	U	0.0017	U	0.0019	U	0.0016	U
1,2,3-Trichloropropane	96-18-4	NS	-	NS	0.0023	U	0.0017	U	0.0016	U	0.002	U	0.0018	U	0.0017	U	0.0019	U	0.0016	U
1,2,4,5-Tetramethylbenzene	95-93-2	NS	-	NS	0.0023	U	0.0017	U	0.0016	U	0.002	U	0.0018	U	0.0017	U	0.0019	U	0.0016	U
1,2,4-Trichlorobenzene	120-82-1	NS	-	NS	0.0023	U	0.0017	U	0.0016	U	0.002	U	0.0018	U	0.0017	U	0.0019	U	0.0016	U
1,2,4-Trimethylbenzene	95-63-6	3.6	-	52	0.0023	U	0.0017	U	0.0016	U	0.002	U	0.0018	U	0.0017	U	0.0019	U	0.0016	U
1,2-Dibromo-3-chloropropane	96-12-8	NS	-	NS	0.0034	U	0.0026	U	0.0024	U	0.0031	U	0.0027	U	0.0026	U	0.0028	U	0.0024	U
1,2-Dibromoethane	106-93-4	NS	-	NS	0.0011	U	0.00085	U	0.00081	U	0.001	U	0.00091	U	0.00087	U	0.00094	U	0.0008	U
1,2-Dichlorobenzene	95-50-1	1.1	-	100	0.0023	U	0.0017	U	0.0016	U	0.002	U	0.0018	U	0.0017	U	0.0019	U	0.0016	U
1,2-Dichloroethane	107-06-2	0.02	-	3.1	0.0011	U	0.00085	U	0.00081	U	0.001	U	0.00091	U	0.00087	U	0.00094	U	0.0008	U
1,2-Dichloroethene, Total	540-59-0	NS	-	NS	0.0011	U	0.00085	U	0.00081	U	0.001	U	0.00091	U	0.00087	U	0.00094	U	0.0008	U
1,2-Dichloropropane	78-87-5	NS	-	NS	0.0011	U	0.00085	U	0.00081	U	0.001	U	0.00091	U	0.00087	U	0.00094	U	0.0008	U
1,3,5-Trimethylbenzene	108-67-8	8.4	-	52	0.0023	U	0.0017	U	0.0016	U	0.002	U	0.0018	U	0.0017	U	0.0019	U	0.0016	U
1,3-Dichlorobenzene	541-73-1	2.4	-	49	0.0023	U	0.0017	U	0.0016	U	0.002	U	0.0018	U	0.0017	U	0.0019	U	0.0016	U
1,3-Dichloropropane	142-28-9	NS	-	NS	0.0023	U	0.0017	U	0.0016	U	0.002	U	0.0018	U	0.0017	U	0.0019	U	0.0016	U
1,3-Dichloropropene, Total	542-75-6	NS	-	NS	0.00057	U	0.00042	U	0.00041	U	0.00051	U	0.00045	U	0.00044	U	0.00047	U	0.0004	U
1,4-Dichlorobenzene	106-46-7	1.8	-	13	0.0023	U	0.0017	U	0.0016	U	0.002	U	0.0018	U	0.0017	U	0.0019	U	0.0016	U
1,4-Dioxane	123-91-1	0.1	-	13	0.091	U	0.068	U	0.065	U	0.082	U	0.073	U	0.07	U	0.075	U	0.064	U
2,2-Dichloropropane	594-20-7	NS	-	NS	0.0023	U	0.0017	U	0.0016	U	0.002	U	0.0018	U	0.0017	U	0.0019	U	0.0016	U
2-Butanone	78-93-3	0.12	-	100	0.011	U	0.0085	U	0.0081	U	0.01	U	0.0091	U	0.0087	U	0.0094	U	0.008	U
2-Hexanone	591-78-6	NS	-	NS	0.011	U	0.0085	U	0.0081	U	0.01	U	0.0091	U	0.0087	U	0.0094	U	0.008	U
4-Methyl-2-pentanone	108-10-1	NS	-	NS	0.011	U	0.0085	U	0.0081	U	0.01	U	0.0091	U	0.0087	U	0.0094	U	0.008	U
Acetone	67-64-1	0.05	-	100	0.02	U	0.011	U	0.0097	U	0.01	U	0.0048	J	0.0058	J	0.0098	U	0.008	U
Acrylonitrile	107-13-1	NS	-	NS	0.0046	U	0.0034	U	0.0032	U	0.0041	U	0.0036	U	0.0035	U	0.0038	U	0.0032	U
Benzene	71-43-2	0.06	-	4.8	0.00057	U	0.00042	U	0.00041	U	0.00051	U	0.00045	U	0.00044	U	0.00047	U	0.0004	U
Bromobenzene	108-86-1	NS	-	NS	0.0023	U	0.0017	U	0.0016	U	0.002	U	0.0018	U	0.0017	U	0.0019	U	0.0016	U
Bromochloromethane	74-97-5	NS	-	NS	0.0023	U	0.0017	U	0.0016	U	0.002	U	0.0018	U	0.0017	U	0.0019	U	0.0016	U
Bromodichloromethane	75-27-4	NS	-	NS	0.00057	U	0.00042	U	0.00041	U	0.00051	U	0.00045	U	0.00044	U	0.00047	U	0.0004	U
Bromoform	75-25-2	NS	-	NS	0.0046	U	0.0034	U	0.0032	U	0.0041	U	0.0036	U	0.0035	U	0.0038	U	0.0032	U
Bromomethane	74-83-9	NS	-	NS	0.0023	U	0.0017	U	0.0016	U	0.002	U	0.0018	U	0.0017	U	0.0019	U	0.0016	U
Carbon disulfide	75-15-0	NS	-	NS	0.011	U	0.0085	U	0.0081	U	0.01	U	0.0091	U	0.0087	U	0.0094	U	0.008	U
Carbon tetrachloride	56-23-5	0.76	-	2.4	0.0011	U	0.00085	U	0.00081	U	0.001	U	0.00091	U	0.00087	U	0.00094	U	0.0008	U
Chlorobenzene	108-90-7	1.1	-	100	0.00057	U	0.00042	U	0.00041	U	0.00051	U	0.00045	U	0.00044	U	0.00047	U	0.0004	U
Chloroethane	75-00-3	NS	-	NS	0.0023	U	0.0017	U	0.0016	U	0.002	U	0.0018	U	0.0017	U	0.0019	U	0.0016	U
Chloroform	67-66-3	0.37	-	49	0.0017	U	0.0013	U	0.0012	U	0.0015	U	0.0014	U	0.0013	U	0.0014	U	0.0012	U
Chloromethane	74-87-3	NS	-	NS	0.0046	U	0.0034	U	0.0032	U	0.0041	U	0.0036	U	0.0035	U	0.0038	U	0.0032	U
cis-1,2-Dichloroethene	156-59-2	0.25	-	100	0.0011	U	0.00085	U	0.00081	U	0.001	U	0.00091	U	0.00087	U	0.00094	U	0.0008	U
cis-1,3-Dichloropropene	10061-01-5	NS	-	NS	0.00057	U	0.00042	U	0.00041	U	0.00051	U	0.00045	U	0.00044	U	0.00047	U	0.0004	U
Dibromochloromethane	124-48-1	NS	-	NS	0.0011	U	0.00085	U	0.00081	U	0.001	U	0.00091	U	0.00087	U	0.00094	U	0.0008	U
Dibromomethane	74-95-3	NS	-	NS	0.0023	U	0.0017	U	0.0016	U	0.002	U	0.0018	U	0.0017	U	0.0019			



Table 2  
Soil VOC Analytical Data  
1045-1065 Atlantic Avenue, Brooklyn, New York

Sample Area:						Track 2 Area														
Sample ID:	CAS Number	NYSDEC Unrestricted Use SCOs (1)	NYSDEC Protection of Groundwater SCOs (2)	NYSDEC Restricted-Residential Use SCOs (3)	EP030 15' 6/5/2023 L2331251-10	15' 6/6/2023 L2331476-01	21' 6/16/2023 L2334612-03	EP031 15' 6/6/2023 L2331476-02	EP032 15' 6/6/2023 L2331476-02	EP033 15' 6/6/2023 L2331476-03	21' 6/15/2023 L2334071-03	EP034 15' 6/12/2023 L2333318-01	21' 6/15/2023 L2334071-02	EP035 15' 6/13/2023 L2333318-03	EP036 15' 6/15/2023 L2334071-06	21' 6/15/2023 L2334071-04	EP037 15' 6/15/2023 L2334071-05	EP037 21' 6/15/2023 L2334071-01		
Sampling Date:																				
Lab Sample ID:																				
Volatile Organic Compounds by EPA Method 8260 in mg/kg																				
1,1,1,2-Tetrachloroethane	630-20-6	NS	-	NS	0.00052	U	0.00056	U	0.00044	U	0.00068	U	0.029	U	0.0005	U	0.0005	U	0.00051	U
1,1,1-Trichloroethane	71-55-6	0.68	-	100	0.00052	U	0.00056	U	0.00044	U	0.00068	U	0.029	U	0.0005	U	0.00055	U	0.00051	U
1,1,2,2-Tetrachloroethane	79-34-5	NS	-	NS	0.00052	U	0.00056	U	0.00044	U	0.00068	U	0.029	U	0.0005	U	0.00055	U	0.00051	U
1,1,2-Trichloroethane	79-00-5	NS	-	NS	0.001	U	0.0011	U	0.00088	U	0.0014	U	0.058	U	0.001	U	0.00099	U	0.001	U
1,1-Dichloroethane	75-34-3	0.27	-	26	0.001	U	0.0011	U	0.00088	U	0.0014	U	0.058	U	0.001	U	0.00099	U	0.001	U
1,1-Dichloroethene	75-35-4	0.33	-	100	0.001	U	0.0011	U	0.00088	U	0.0014	U	0.058	U	0.001	U	0.00099	U	0.001	U
1,1-Dichloropropene	563-58-6	NS	-	NS	0.00052	U	0.00056	U	0.00044	U	0.00068	U	0.029	U	0.0005	U	0.00055	U	0.00051	U
1,2,3-Trichlorobenzene	87-61-6	NS	-	NS	0.0021	U	0.0022	U	0.0018	U	0.0027	U	0.12	U	0.002	U	0.0022	U	0.002	U
1,2,3-Trichloropropane	96-18-4	NS	-	NS	0.0021	U	0.0022	U	0.0018	U	0.0027	U	0.12	U	0.002	U	0.0022	U	0.002	U
1,2,4,5-Tetramethylbenzene	95-93-2	NS	-	NS	0.0021	U	0.0022	U	0.0018	U	0.0027	U	0.12	U	0.002	U	0.0022	U	0.002	U
1,2,4-Trichlorobenzene	120-82-1	NS	-	NS	0.0021	U	0.0022	U	0.0018	U	0.0027	U	0.12	U	0.002	U	0.0022	U	0.002	U
1,2,4-Trimethylbenzene	95-63-6	3.6	-	52	0.0021	U	0.0022	U	0.0018	U	0.0027	U	0.12	U	0.002	U	0.0022	U	0.002	U
1,2-Dibromo-3-chloropropane	96-12-8	NS	-	NS	0.0031	U	0.0033	U	0.0026	U	0.004	U	0.17	U	0.003	U	0.0033	U	0.0031	U
1,2-Dibromoethane	106-93-4	NS	-	NS	0.001	U	0.0011	U	0.00088	U	0.0014	U	0.058	U	0.001	U	0.00099	U	0.001	U
1,2-Dichlorobenzene	95-50-1	1.1	-	100	0.0021	U	0.0022	U	0.0018	U	0.0027	U	0.12	U	0.002	U	0.0022	U	0.002	U
1,2-Dichloroethane	107-06-2	0.02	-	3.1	0.001	U	0.0011	U	0.00088	U	0.0014	U	0.058	U	0.001	U	0.00099	U	0.001	U
1,2-Dichloroethene, Total	540-59-0	NS	-	NS	0.001	U	0.0011	U	0.00088	U	0.0014	U	0.058	U	0.001	U	0.00099	U	0.001	U
1,2-Dichloropropane	78-87-5	NS	-	NS	0.001	U	0.0011	U	0.00088	U	0.0014	U	0.058	U	0.001	U	0.00099	U	0.001	U
1,3,5-Trimethylbenzene	108-67-8	8.4	-	52	0.0021	U	0.0022	U	0.0018	U	0.0027	U	0.12	U	0.002	U	0.0022	U	0.002	U
1,3-Dichlorobenzene	541-73-1	2.4	-	49	0.0021	U	0.0022	U	0.0018	U	0.0027	U	0.12	U	0.002	U	0.0022	U	0.002	U
1,3-Dichloropropane	142-28-9	NS	-	NS	0.0021	U	0.0022	U	0.0018	U	0.0027	U	0.12	U	0.002	U	0.0022	U	0.002	U
1,3-Dichloropropene, Total	542-75-6	NS	-	NS	0.00052	U	0.00056	U	0.00044	U	0.00068	U	0.029	U	0.0005	U	0.00055	U	0.00051	U
1,4-Dichlorobenzene	106-46-7	1.8	-	13	0.0021	U	0.0022	U	0.0018	U	0.0027	U	0.12	U	0.002	U	0.0022	U	0.002	U
1,4-Dioxane	123-91-1	0.1	-	13	0.083	U	0.089	U	0.071	U	0.11	U	4.6	U	0.08	U	0.079	U	0.082	U
2,2-Dichloropropane	594-20-7	NS	-	NS	0.0021	U	0.0022	U	0.0018	U	0.0027	U	0.12	U	0.002	U	0.0022	U	0.002	U
2-Butanone	78-93-3	0.12	-	100	0.01	U	0.011	U	0.0088	U	0.014	U	0.58	U	0.01	U	0.0099	U	0.01	U
2-Hexanone	591-78-6	NS	-	NS	0.01	U	0.011	U	0.0088	U	0.014	U	0.58	U	0.01	U	0.0099	U	0.01	U
4-Methyl-2-pentanone	108-10-1	NS	-	NS	0.01	U	0.011	U	0.0088	U	0.014	U	0.58	U	0.01	U	0.0099	U	0.01	U
Acetone	67-64-1	0.05	-	100	0.0086	J	0.011	U	0.0066	J	0.014	U	0.58	U	0.01	U	0.014	U	0.01	U
Acrylonitrile	107-13-1	NS	-	NS	0.0042	U	0.0044	U	0.0035	U	0.0054	U	0.23	U	0.004	U	0.0044	U	0.0041	U
Benzene	71-43-2	0.06	-	4.8	0.00052	U	0.00056	U	0.00044	U	0.00068	U	0.029	U	0.0005	U	0.00055	U	0.00051	U
Bromobenzene	108-86-1	NS	-	NS	0.0021	U	0.0022	U	0.0018	U	0.0027	U	0.12	U	0.002	U	0.0022	U	0.002	U
Bromochloromethane	74-97-5	NS	-	NS	0.0021	U	0.0022	U	0.0018	U	0.0027	U	0.12	U	0.002	U	0.0022	U	0.002	U
Bromodichloromethane	75-27-4	NS	-	NS	0.00052	U	0.00056	U	0.00044	U	0.00068	U	0.029	U	0.0005	U	0.00055	U	0.00051	U
Bromoform	75-25-2	NS	-	NS	0.0042	U	0.0044	U	0.0035	U	0.0054	U	0.23	U	0.004	U	0.0044	U	0.0041	U
Bromomethane	74-83-9	NS	-	NS	0.0021	U	0.0022	U	0.0018	U	0.0027	U	0.12	U	0.002	U	0.0022	U	0.002	U
Carbon disulfide	75-15-0	NS	-	NS	0.01	U	0.011	U	0.0088	U	0.014	U	0.58	U	0.01	U	0.0099	U	0.01	U
Carbon tetrachloride	56-23-5	0.76	-	2.4	0.001	U	0.0011	U	0.00088	U	0.0014	U	0.058	U	0.001	U	0.00099	U	0.001	U
Chlorobenzene	108-90-7	1.1	-	100	0.00052	U	0.00056	U	0.00044	U	0.00068	U	0.029	U	0.0005	U	0.00055	U	0.00051	U
Chloroethane	75-00-3	NS	-	NS	0.0021	U	0.0022	U	0.0018	U	0.0027	U	0.12	U	0.002	U	0.0022	U	0.002	U
Chloroform	67-66-3	0.37	-	49	0.0016	U	0.0017	U	0.0013	U	0.002	U	0.087	U	0.0015	U	0.0016	U	0.0015	U
Chloromethane	74-87-3	NS	-	NS	0.0042	U	0.0044	U	0.0035	U	0.0054	U	0.23	U	0.004	U	0.0044	U	0.0041	U
cis-1,2-Dichloroethene	156-59-2	0.25	-	100	0.001	U	0.0011	U	0.00088	U	0.0014	U	0.058	U	0.001	U	0.00099	U	0.001	U
cis-1,3-Dichloropropene	10061-01-5	NS	-	NS	0.00052	U	0.00056	U	0.00044	U	0.00068	U	0.029	U	0.0005	U	0.00055	U	0.00051	U
Dibromochloromethane	124-48-1	NS	-	NS	0.001	U	0.0011	U	0.00088	U	0.0014	U	0.058	U	0.001	U	0.00099	U	0.001	U
Dibromomethane	74-95-3	NS	-	NS	0.0021	U	0.0022	U	0.0018	U	0.0027	U	0.12	U	0.002	U	0.0022	U	0.002	U
Dichlorodifluoromethane	75-71-8	NS	-	NS	0.01	U	0.011	U	0.0088	U	0.014	U	0.58	U	0.01	U	0.0099	U	0.01	U
Ethyl ether	60-																			





Table 2  
Soil SVOC Analytical Data  
1045-1065 Atlantic Avenue, Brooklyn, New York

Sample Area:	CAS Number	NYSDEC Unrestricted Use SCOs (1)	NYSDEC Restricted- Residential Use SCOs (2)	Track 4 Area																		
Sample ID:				SW001		EP004	EP005	EP006	EP007		EP008	EP038		EP041	EP042	EP043						
Sample Depth:				2'	2'	2'	2'	2'	2'	2'	2'	2'	2'	2'	2'	2'						
Sampling Date:				5/24/2023	5/24/2023	5/22/2023	5/22/2023	5/22/2023	5/22/2023	5/22/2023	5/22/2023	5/22/2023	6/16/2023	6/16/2023	7/5/2023	7/5/2023	7/5/2023					
Lab Sample ID:	L2329121-02	L2329121-02 R1	L2328475-01	L2328475-02	L2328475-03	L2328475-04	L2328475-04 R1	L2328475-05	L2334612-01	L2334612-01 R1	L2338252-01	L2338252-02	L2338252-04									
Semi Volatile Organic Compounds by EPA Method 8270 in mg/Kg																						
1,2,4,5-Tetrachlorobenzene	95-94-3	NS	NS	0.18	U	NA	0.18	U	0.19	U	0.97	U	0.19	U	NA	0.18	U	0.19	U	0.18	U	
1,2,4-Trichlorobenzene	120-82-1	NS	NS	0.18	U	NA	0.18	U	0.19	U	0.97	U	0.19	U	NA	0.18	U	0.19	U	0.18	U	
1,2-Dichlorobenzene	95-50-1	1.1	100	0.18	U	NA	0.18	U	0.19	U	0.97	U	0.19	U	NA	0.18	U	0.19	U	0.18	U	
1,3-Dichlorobenzene	541-73-1	2.4	49	0.18	U	NA	0.18	U	0.19	U	0.97	U	0.19	U	NA	0.18	U	0.19	U	0.18	U	
1,4-Dichlorobenzene	106-46-7	1.8	13	0.18	U	NA	0.18	U	0.19	U	0.97	U	0.19	U	NA	0.18	U	0.19	U	0.18	U	
1,4-Dioxane	123-91-1	0.1	13	0.028	U	NA	0.028	U	0.14	U	0.028	U	NA	0.028	U	0.028	U	0.031	U	0.029	U	
2,4,5-Trichlorophenol	95-95-4	NS	NS	0.18	U	NA	0.18	U	0.19	U	0.97	U	0.19	U	NA	0.18	U	0.19	U	0.18	U	
2,4,6-Trichlorophenol	88-06-2	NS	NS	0.11	U	NA	0.11	U	0.11	U	0.58	U	0.11	U	NA	0.11	U	0.11	U	0.11	U	
2,4-Dichlorophenol	120-83-2	NS	NS	0.17	U	NA	0.16	U	0.17	U	0.87	U	0.17	U	NA	0.17	U	0.17	U	0.16	U	
2,4-Dimethylphenol	105-67-9	NS	NS	0.18	U	NA	0.18	U	0.19	U	0.97	U	0.19	U	NA	0.18	U	0.19	U	0.18	U	
2,4-Dinitrophenol	51-28-5	NS	NS	0.89	U	NA	0.88	U	0.92	U	4.7	U	0.89	U	NA	0.89	U	0.9	U	NA	0.88	U
2,4-Dinitrotoluene	121-14-2	NS	NS	0.18	U	NA	0.18	U	0.19	U	0.97	U	0.19	U	NA	0.18	U	0.19	U	0.18	U	
2,6-Dinitrotoluene	606-20-2	NS	NS	0.18	U	NA	0.18	U	0.19	U	0.97	U	0.19	U	NA	0.18	U	0.19	U	0.18	U	
2-Chloronaphthalene	91-58-7	NS	NS	0.18	U	NA	0.18	U	0.19	U	0.97	U	0.19	U	NA	0.18	U	0.19	U	0.18	U	
2-Chlorophenol	95-57-8	NS	NS	0.18	U	NA	0.18	U	0.19	U	0.97	U	0.19	U	NA	0.18	U	0.19	U	0.18	U	
2-Methylnaphthalene	91-57-6	NS	NS	0.48		NA	0.19	J	0.11	J	1.2	U	0.75		NA	0.081	J	0.36		NA	0.22	U
2-Methylphenol	95-48-7	0.33	100	0.06	J	NA	0.18	U	0.19	U	0.97	U	0.043	J	NA	0.18	U	0.19	U	0.18	U	
2-Nitroaniline	88-74-4	NS	NS	0.18	U	NA	0.18	U	0.19	U	0.97	U	0.19	U	NA	0.18	U	0.19	U	0.18	U	
2-Nitrophenol	88-75-5	NS	NS	0.4	U	NA	0.4	U	0.41	U	2.1	U	0.4	U	NA	0.4	U	0.4	U	NA	0.4	U
3,3'-Dichlorobenzidine	91-94-1	NS	NS	0.18	U	NA	0.18	U	0.19	U	0.97	U	0.19	U	NA	0.18	U	0.19	U	0.18	U	
3-Methylphenol/4-Methylphenol	108-39-4/106-44-5	0.33	100	0.32		NA	0.26	U	0.041	J	1.4	U	0.13	J	NA	0.051	J	0.095	J	NA	0.26	U
3-Nitroaniline	99-09-2	NS	NS	0.18	U	NA	0.18	U	0.19	U	0.97	U	0.19	U	NA	0.18	U	0.19	U	0.18	U	
4,6-Dinitro-o-cresol	534-52-1	NS	NS	0.48	U	NA	0.48	U	0.5	U	2.5	U	0.48	U	NA	0.48	U	0.49	U	NA	0.48	U
4-Bromophenyl phenyl ether	101-55-3	NS	NS	0.18	U	NA	0.18	U	0.19	U	0.97	U	0.19	U	NA	0.18	U	0.19	U	0.18	U	
4-Chloroaniline	106-47-8	NS	NS	0.18	U	NA	0.18	U	0.19	U	0.97	U	0.19	U	NA	0.18	U	0.19	U	0.18	U	
4-Chlorophenyl phenyl ether	7005-72-3	NS	NS	0.18	U	NA	0.18	U	0.19	U	0.97	U	0.19	U	NA	0.18	U	0.19	U	0.18	U	
4-Nitroaniline	100-01-6	NS	NS	0.18	U	NA	0.18	U	0.19	U	0.97	U	0.19	U	NA	0.18	U	0.19	U	0.18	U	
4-Nitrophenol	100-02-7	NS	NS	0.26	U	NA	0.26	U	0.27	U	1.4	U	0.26	U	NA	0.26	U	0.26	U	NA	0.26	U
Acenaphthene	83-32-9	20	100	1		NA	0.13	J	0.2		0.47	J	1.2		NA	0.21		0.93		NA	0.17	U
Acenaphthylene	208-96-8	100	100	3.2		NA	0.22		0.44		0.5	J	0.78		NA	0.41		0.58		NA	0.17	U
Acetophenone	98-86-2	NS	NS	0.18	U	NA	0.18	U	0.029	J	0.97	U	0.19	U	NA	0.18	U	0.19	U	0.18	U	
Anthracene	120-12-7	100	100	4.9		NA	0.38		0.74		2.2		2.7		NA	0.76		2.6		NA	0.12	U
Benzo(a)anthracene	56-55-3	1	1	16	E	21	1.4		2.7		8.1		7.2		NA	2.9		6.3		NA	0.067	J
Benzo(a)pyrene	50-32-8	1	1	13	E	21	1.2		2.7		7.2		6.7		NA	2.8		6		NA	0.061	J
Benzo(b)fluoranthene	205-99-2	1	1	18	E	24	1.6		3.4		9.3		8.4	E	12	3.6		7.5	E	5	0.065	J
Benzo(ghi)perylene	191-24-2	100	100	7.4		NA	0.73		1.7		4.3		4.1		NA	1.8		3.4		NA	0.038	J
Benzo(k)fluoranthene	207-08-9	0.8	3.9	2.8		NA	0.48		0.93		2.4		2.4		NA	0.81		1.4		NA	0.12	U
Benzoic Acid	65-85-0	NS	NS	0.6	U	NA	0.6	U	0.62	U	3.1	U	0.6	U	NA	0.6	U	0.61	U	NA	0.67	U
Benzyl Alcohol	100-51-6	NS	NS	0.18	U	NA	0.18	U	0.19	U	0.97	U	0.19	U	NA	0.18	U	0.19	U	0.18	U	
Biphenyl	92-52-4	NS	NS	0.16	J	NA	0.061	J	0.039	J	2.2	U	0.19	J	NA	0.029	J	0.1	J	NA	0.47	U
Bis(2-chloroethoxy)methane	111-91-1	NS	NS	0.2	U	NA	0.2	U	0.2	U	1	U	0.2	U	NA	0.2	U	0.2	U	NA	0.22	U
Bis(2-chloroethyl)ether	111-44-4	NS	NS	0.17	U	NA	0.16	U	0.17	U	0.87	U	0.17	U	NA	0.17	U	0.17	U	NA	0.19	U
Bis(2-chloroisopropyl)ether	108-60-1	NS	NS	0.22	U	NA	0.22	U	0.23	U	1.2	U	0.22	U	NA	0.22	U	0.22	U	NA	0.25	U
Bis(2-ethylhexyl)phthalate	117-81-7	NS	NS	0.18	U	NA	0.18	U	0.19	U	0.97	U	0.19	U	NA	0.18	U	0.19	U	0.18	U	
Butyl benzyl phthalate	85-68-7	NS	NS	0.18	U	NA	0.18	U	0.46		0.97	U	0.19	U	NA	0.18	U	0.19	U	0.18	U	
Carbazole	86-74-8	NS	NS	1.5		NA	0.18		0.43		1.2		1.5		NA	0.48		0.97		NA	0.21	U
Chrysene	218-01-9	1	3.9	12	E	20	1.4		2.8		7.7		7.2		NA	3.1		5.8		NA	0.059	J
Di-n-butylphthalate	84-74-2	NS	NS	0.18	U	NA	0.18	U	0.19	U	0.97	U	0.19	U	NA	0.18	U	0.19	U	0.18	U	
Di-n-octylphthalate	117-84-0	NS	NS	0.18	U	NA	0.18	U	0.19	U	0.97	U	0.19	U	NA	0.18	U	0.19	U	0.18	U	
Dibenzo(a,h)anthracene	53-70-3	0.33	0.33	1.4		NA	0.17		0.34		0.94		0.87		NA	0.37		0.72		NA	0.12	U
Dibenzofuran	132-64-9	7	59	1		NA	0.12	J	0.23		0.31	J	0.98		NA	0.2		0.68		NA	0.21	U
Diethyl phthalate	84-66-2	NS	NS	0.18	U	NA	0.18	U	0.19	U	0.97	U	0.19	U	NA	0.18	U	0.19	U	0.18	U	
Dimethyl phthalate	131-11-3	NS	NS	0.18	U	NA	0.18	U	0.19	U	0.97	U	0.19	U	NA	0.18	U	0.19	U	0.18	U	
Fluoranthene	206-44-0	100	100	23	E	48	3.2		5.9		17		13	E	26	6.5		14	E	11	0.17	
Fluorene	86-73-7	30	100	1.4		NA	0.16	J	0.27		0.66	J	1.1		NA	0.21		0.99		NA	0.21	U
Hexachlorobenzene	118-74-1	0.33	1.2	0.11	U	NA	0.11	U	0.11	U	0.58	U	0.11	U	NA	0.11	U	0.11	U	0.11	U	
Hexachlorobutadiene	87-68-3	NS	NS	0.18	U	NA	0.18	U	0.19	U	0.97	U	0.19	U	NA	0.18	U	0.19	U	0.18	U	
Hexachlorocyclopentadiene	77-47-4	NS	NS	0.53	U	NA	0.53	U	0.54	U	2.8	U	0.53	U	NA	0.						

Notes:

(1) NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Unrestricted Use of Soil Cleanup Objective Table 375-6.8a 12/06

(2) NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Restricted Use of Soil Cleanup Objective Table 375-6.8b 12/06

NS - No standard

NA - Not Analyzed

J - Estimated Value

U - The compound was not detected at the indicated concentration.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

Shaded text denotes concentrations exceeding NYSDEC Unrestricted Use

Shaded text denotes concentrations exceeding NYSDEC Restricted Residential Use

Table 2  
Soil SVOC Analytical Data  
1045-1065 Atlantic Avenue, Brooklyn, New York

Sample Area:	CAS Number	NYSDEC Unrestricted Use SCOs (1)	NYSDEC Restricted- Residential Use SCOs (2)	Track 2 Area																
Sample ID:				EP001 15'	EP002 15'	EP003 15'	EP009 15'	EP010 15'	EP011 15'	EP011 15'	EP012 15'	EP013 15'	EP014 15'	EP015 15'	EP016 15'	EP017 15'	EP018 15'	EP019 15'		
Sample Depth:				5/18/2023	5/19/2023	5/19/2023	5/23/2023	5/24/2023	5/25/2023	5/25/2023	5/30/2023	5/31/2023	5/31/2023	5/31/2023	5/31/2023	5/31/2023	5/31/2023	5/31/2023	5/31/2023	
Sampling Date:				L2327803-01	L2328139-02	L2328139-01	L2328760-01	L2329121-01	L2329677-01	L2329677-01 R1	L2329999-01	L2330233-01	L2330233-02	L2330233-03	L2330233-04	L2330233-05	L2330233-06	L2330233-07		
Lab Sample ID:																				
Semi Volatile Organic Compounds by EPA Method 8270 in mg/Kg																				
1,2,4,5-Tetrachlorobenzene	95-94-3	NS	NS	0.17 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.19 U	0.18 U	0.18 U	0.18 U	0.18 U	0.17 U	0.17 U	0.18 U			
1,2,4-Trichlorobenzene	120-82-1	NS	NS	0.17 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.19 U	0.18 U	0.18 U	0.18 U	0.18 U	0.17 U	0.17 U	0.18 U			
1,2-Dichlorobenzene	95-50-1	1.1	100	0.17 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.19 U	0.18 U	0.18 U	0.18 U	0.18 U	0.17 U	0.17 U	0.18 U			
1,3-Dichlorobenzene	541-73-1	2.4	49	0.17 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.19 U	0.18 U	0.18 U	0.18 U	0.18 U	0.17 U	0.17 U	0.18 U			
1,4-Dichlorobenzene	106-46-7	1.8	13	0.17 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.19 U	0.18 U	0.18 U	0.18 U	0.18 U	0.17 U	0.17 U	0.18 U			
1,4-Dioxane	123-91-1	0.1	13	0.026 U	0.027 U	0.028 U	0.027 U	0.027 U	0.028 U	0.028 U	0.027 U	0.027 U	0.027 U	0.027 U	0.026 U	0.026 U	0.028 U			
2,4,5-Trichlorophenol	95-95-4	NS	NS	0.17 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.19 U	0.18 U	0.18 U	0.18 U	0.18 U	0.17 U	0.17 U	0.18 U			
2,4,6-Trichlorophenol	88-06-2	NS	NS	0.1 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.1 U	0.1 U	0.11 U			
2,4-Dichlorophenol	120-83-2	NS	NS	0.16 U	0.16 U	0.17 U	0.16 U	0.16 U	0.16 U	0.17 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U			
2,4-Dimethylphenol	105-67-9	NS	NS	0.17 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.19 U	0.18 U	0.18 U	0.18 U	0.18 U	0.17 U	0.17 U	0.18 U			
2,4-Dinitrophenol	51-28-5	NS	NS	0.84 U	0.86 U	0.89 U	0.88 U	0.88 U	0.88 U	0.89 U	0.87 U	0.86 U	0.87 U	0.86 U	0.88 U	0.83 U	0.88 U			
2,4-Dinitrotoluene	121-14-2	NS	NS	0.17 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.19 U	0.18 U	0.18 U	0.18 U	0.18 U	0.17 U	0.17 U	0.18 U			
2,6-Dinitrotoluene	606-20-2	NS	NS	0.17 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.19 U	0.18 U	0.18 U	0.18 U	0.18 U	0.17 U	0.17 U	0.18 U			
2-Chloronaphthalene	91-58-7	NS	NS	0.17 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.19 U	0.18 U	0.18 U	0.18 U	0.18 U	0.17 U	0.17 U	0.18 U			
2-Chlorophenol	95-57-8	NS	NS	0.17 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.19 U	0.18 U	0.18 U	0.18 U	0.18 U	0.17 U	0.17 U	0.18 U			
2-Methylnaphthalene	91-57-6	NS	NS	0.084 J	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.21 U	0.22 U	0.22 U	0.21 U	0.21 U	0.22 U			
2-Methylphenol	95-48-7	0.33	100	0.17 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.19 U	0.18 U	0.18 U	0.18 U	0.18 U	0.17 U	0.17 U	0.18 U			
2-Nitroaniline	88-74-4	NS	NS	0.17 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.19 U	0.18 U	0.18 U	0.18 U	0.18 U	0.17 U	0.17 U	0.18 U			
2-Nitrophenol	88-75-5	NS	NS	0.38 U	0.39 U	0.4 U	0.4 U	0.4 U	0.4 U	0.39 U	0.38 U	0.39 U	0.39 U	0.39 U	0.37 U	0.38 U	0.4 U			
3,3'-Dichlorobenzidine	91-94-1	NS	NS	0.17 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.19 U	0.18 U	0.18 U	0.18 U	0.18 U	0.17 U	0.17 U	0.18 U			
3-Methylphenol/4-Methylphenol	108-39-4/106-44-5	0.33	100	0.25 U	0.26 U	0.27 U	0.26 U	0.26 U	0.26 U	0.27 U	0.26 U	0.26 U	0.26 U	0.26 U	0.25 U	0.25 U	0.26 U			
3-Nitroaniline	99-09-2	NS	NS	0.17 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.19 U	0.18 U	0.18 U	0.18 U	0.18 U	0.17 U	0.17 U	0.18 U			
4,6-Dinitro-o-cresol	534-52-1	NS	NS	0.45 U	0.47 U	0.48 U	0.48 U	0.48 U	0.48 U	0.47 U	0.46 U	0.47 U	0.47 U	0.47 U	0.45 U	0.45 U	0.48 U			
4-Bromophenyl phenyl ether	101-55-3	NS	NS	0.17 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.19 U	0.18 U	0.18 U	0.18 U	0.18 U	0.17 U	0.17 U	0.18 U			
4-Chloroaniline	106-47-8	NS	NS	0.17 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.19 U	0.18 U	0.18 U	0.18 U	0.18 U	0.17 U	0.17 U	0.18 U			
4-Chlorophenyl phenyl ether	7005-72-3	NS	NS	0.17 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.19 U	0.18 U	0.18 U	0.18 U	0.18 U	0.17 U	0.17 U	0.18 U			
4-Nitroaniline	100-01-6	NS	NS	0.17 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.19 U	0.18 U	0.18 U	0.18 U	0.18 U	0.17 U	0.17 U	0.18 U			
4-Nitrophenol	100-02-7	NS	NS	0.24 U	0.25 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.25 U	0.25 U	0.25 U	0.25 U	0.24 U	0.24 U	0.26 U			
Acenaphthene	83-32-9	20	100	0.25	0.14 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.14 U	0.14 U	0.14 U	0.14 U	0.15 U	0.14 U	0.023 J			
Acenaphthylene	208-96-8	100	100	0.088 J	0.14 U	0.15 U	0.15 U	0.15 U	0.15 U	0.14 U	0.14 U	0.14 U	0.14 U	0.12 J	0.15 U	0.14 U	0.042 J			
Acetophenone	98-86-2	NS	NS	0.17 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.19 U	0.18 U	0.18 U	0.18 U	0.18 U	0.17 U	0.17 U	0.18 U			
Anthracene	120-12-7	100	100	0.59	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.095 J	0.11 U	0.064 J	0.11 U			
Benzo(a)anthracene	56-55-3	1	1	1.2	0.11 U	0.11 U	0.052 J	0.11 U	0.11 U	0.11 U	0.11 U	0.058 J	0.039 J	0.63	0.063 J	0.036 J	0.028 J			
Benzo(a)pyrene	50-32-8	1	1	1.3	0.14 U	0.15 U	0.049 J	0.15 U	0.15 U	0.15 U	0.15 U	0.051 J	0.046 J	0.75	0.07 J	0.14 U	0.15 U			
Benzo(b)fluoranthene	205-99-2	1	1	1.5	0.11 U	0.11 U	0.054 J	0.11 U	0.11 U	0.11 U	0.11 U	0.065 J	0.061 J	0.89	0.11	0.042 J	0.11 U			
Benzo(ghi)perylene	191-24-2	100	100	0.62	0.14 U	0.15 U	0.029 J	0.15 U	0.15 U	0.15 U	0.14 U	0.033 J	0.029 J	0.43	0.049 J	0.023 J	0.15 U			
Benzo(k)fluoranthene	207-08-9	0.8	3.9	0.48	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.23	0.037 J	0.1 U	0.11 U			
Benzoic Acid	65-85-0	NS	NS	0.56 U	0.58 U	0.6 U	0.59 U	0.59 U	0.6 U	0.6 U	0.59 U	0.58 U	0.59 U	0.58 U	0.59 U	0.56 U	0.59 U			
Benzyl Alcohol	100-51-6	NS	NS	0.17 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.19 U	0.18 U	0.18 U	0.18 U	0.18 U	0.17 U	0.17 U	0.18 U			
Biphenyl	92-52-4	NS	NS	0.025 J	0.41 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.41 U	0.41 U	0.41 U	0.41 U	0.39 U	0.4 U	0.42 U			
Bis(2-chloroethoxy)methane	111-91-1	NS	NS	0.19 U	0.19 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.19 U	0.2 U	0.19 U	0.2 U	0.19 U	0.19 U	0.2 U			
Bis(2-chloroethyl)ether	111-44-4	NS	NS	0.16 U	0.16 U	0.17 U	0.16 U	0.16 U	0.16 U	0.17 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U			
Bis(2-chloroisopropyl)ether	108-60-1	NS	NS	0.21 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.21 U	0.22 U	0.22 U	0.22 U	0.21 U	0.21 U	0.22 U			
Bis(2-ethylhexyl)phthalate	117-81-7	NS	NS	0.17 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.19 U	0.18 U	0.18 U	0.18 U	0.18 U	0.17 U	0.17 U	0.18 U			
Butyl benzyl phthalate	85-68-7	NS	NS	0.17 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.19 U	0.18 U	0.18 U	0.18 U	0.18 U	0.17 U	0.17 U	0.18 U			
Carbazole	86-74-8	NS	NS	0.31	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.19 U	0.18 U	0.18 U	0.18 U	0.039 J	0.02 J	0.17 U	0.055 J			
Chrysene	218-01-9	1	3.9	1.2	0.11 U	0.11 U	0.053 J	0.11 U	0.11 U	0.11 U	0.11 U	0.052 J	0.04 J	0.59	0.082 J	0.03 J	0.023 J			
Di-n-butylphthalate	84-74-2																			





Table 2  
Soil SVOC Analytical Data  
1045-1065 Atlantic Avenue, Brooklyn, New York

Sample Area:				Track 2 Area																
Sample ID:	CAS Number	NYSDEC Unrestricted Use SCOs (1)	NYSDEC Restricted- Residential Use SCOs (2)	EP035	EP036	EP037	EP039	EP040	EP044	EP045	EP046	EP047		EP048	EP049	EP050	EP051	EP052	EP053	
Sample Depth:				15'	15'	15'	15'	15'	15'	15'	15'	15'	15'	21'	15'	15'	15'	15'	15'	15'
Sampling Date:				6/13/2023	6/15/2023	6/15/2023	6/16/2023	6/21/2023	7/6/2023	7/6/2023	7/6/2023	7/7/2023	7/26/2023	7/7/2023	7/7/2023	7/13/2023	7/13/2023	7/13/2023	7/20/2023	
Lab Sample ID:				L2333318-03	L2334071-06	L2334071-05	L2334612-02	L2335832-01	L2338463-02	L2338463-03	L2338463-04	L2338846-02	L2343076-01	L2338846-03	L2338846-04	L2340134-01	L2340787-01	L2340134-01	L2341724-01	
Semi Volatile Organic Compounds by EPA Method 8270 in mg/Kg																				
1,2,4,5-Tetrachlorobenzene	95-94-3	NS	NS	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.21 U	0.18 U	0.19 U	0.18 U	0.18 U	
1,2,4-Trichlorobenzene	120-82-1	NS	NS	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.21 U	0.18 U	0.19 U	0.18 U	0.18 U	
1,2-Dichlorobenzene	95-50-1	1.1	100	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.21 U	0.18 U	0.19 U	0.18 U	0.18 U	
1,3-Dichlorobenzene	541-73-1	2.4	49	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.21 U	0.18 U	0.19 U	0.18 U	0.18 U	
1,4-Dichlorobenzene	106-46-4	1.8	13	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.21 U	0.18 U	0.19 U	0.18 U	0.18 U	
1,4-Dioxane	123-91-1	0.1	13	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.028 U	0.027 U	0.026 U	0.032 U	0.027 U	0.028 U	0.027 U	0.027 U	
2,4,5-Trichlorophenol	95-95-4	NS	NS	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.21 U	0.18 U	0.19 U	0.18 U	0.18 U	
2,4,6-Trichlorophenol	88-06-2	NS	NS	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.1 U	0.13 U	0.11 U	0.11 U	0.11 U	0.11 U	
2,4-Dichlorophenol	120-83-2	NS	NS	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.17 U	0.16 U	0.16 U	0.19 U	0.16 U	0.17 U	0.16 U	0.16 U	
2,4-Dimethylphenol	105-67-9	NS	NS	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.21 U	0.18 U	0.19 U	0.18 U	0.18 U	
2,4-Dinitrophenol	51-28-5	NS	NS	0.87 U	0.85 U	0.86 U	0.86 U	0.86 U	0.87 U	0.87 U	0.86 U	0.89 U	0.88 U	0.85 U	1 U	0.88 U	0.9 U	0.87 U	0.87 U	
2,4-Dinitrotoluene	121-14-2	NS	NS	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.21 U	0.18 U	0.19 U	0.18 U	0.18 U	
2,6-Dinitrotoluene	606-20-2	NS	NS	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.21 U	0.18 U	0.19 U	0.18 U	0.18 U	
2-Chloronaphthalene	91-58-7	NS	NS	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.21 U	0.18 U	0.19 U	0.18 U	0.18 U	
2-Chlorophenol	95-57-8	NS	NS	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.21 U	0.18 U	0.19 U	0.18 U	0.18 U	
2-Methylnaphthalene	91-57-6	NS	NS	0.026 J	0.21 U	0.22 U	0.21 U	0.22 U	0.22 U	0.22 U	0.038 J	0.37	0.22 U	0.21 U	0.25 U	0.11 J	0.1 J	0.22 U	14 E	
2-Methylphenol	95-48-7	0.33	100	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.21 U	0.18 U	0.19 U	0.18 U	0.18 U	
2-Nitroaniline	88-74-4	NS	NS	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.21 U	0.18 U	0.19 U	0.18 U	0.18 U	
2-Nitrophenol	88-75-5	NS	NS	0.39 U	0.38 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.38 U	0.4 U	0.39 U	0.38 U	0.46 U	0.4 U	0.4 U	0.39 U	0.39 U	
3,3'-Dichlorobenzidine	91-94-1	NS	NS	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.21 U	0.18 U	0.19 U	0.18 U	0.18 U	
3-Methylphenol/4-Methylphenol	108-39-4/106-44-5	0.33	100	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.047 J	0.26 U	0.25 U	0.3 U	0.26 U	0.1 J	0.26 U	0.26 U	
3-Nitroaniline	99-09-2	NS	NS	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.21 U	0.18 U	0.19 U	0.18 U	0.18 U	
4,6-Dinitro-o-cresol	534-52-1	NS	NS	0.47 U	0.46 U	0.47 U	0.46 U	0.47 U	0.47 U	0.47 U	0.46 U	0.48 U	0.47 U	0.46 U	0.55 U	0.48 U	0.49 U	0.47 U	0.47 U	
4-Bromophenyl phenyl ether	101-55-3	NS	NS	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.21 U	0.18 U	0.19 U	0.18 U	0.18 U	
4-Chloroaniline	106-47-8	NS	NS	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.21 U	0.18 U	0.19 U	0.18 U	0.18 U	
4-Chlorophenyl phenyl ether	7005-72-3	NS	NS	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.21 U	0.18 U	0.19 U	0.18 U	0.18 U	
4-Nitroaniline	100-01-6	NS	NS	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.21 U	0.18 U	0.19 U	0.18 U	0.18 U	
4-Nitrophenol	100-02-7	NS	NS	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.26 U	0.26 U	0.25 U	0.3 U	0.26 U	0.26 U	0.25 U	0.25 U	
Acenaphthene	83-32-9	20	100	0.052 J	0.14 U	0.14 U	0.14 U	0.031 J	0.14 U	0.14 U	0.07 J	0.32	0.14 U	0.14 U	0.17 U	0.019 J	0.094 J	0.14 U	0.64	
Acenaphthylene	208-96-8	100	100	0.072 J	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.057 J	0.3	0.14 U	0.14 U	0.17 U	0.15 U	0.11 J	0.14 U	0.14 U	
Acetophenone	98-86-2	NS	NS	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.21 U	0.18 U	0.19 U	0.18 U	0.18 U	
Anthracene	120-12-7	100	100	0.14	0.11 U	0.11 U	0.11 U	0.065 J	0.11 U	0.11 U	0.18	0.58	0.11 U	0.1 U	0.13 U	0.11 U	0.27	0.11 U	0.33	
Benzo(a)anthracene	56-55-3	1	1	0.46	0.1 J	0.081 J	0.022 J	0.18	0.052 J	0.038 J	0.44	1.4	0.11 U	0.025 J	0.062 J	0.028 J	0.52	0.11 U	0.027 J	
Benzo(a)pyrene	50-32-8	1	1	0.42	0.093 J	0.065 J	0.14 U	0.16	0.055 J	0.051 J	0.45	1.4	0.14 U	0.14 U	0.063 J	0.15 U	0.49	0.14 U	0.14 U	
Benzo(b)fluoranthene	205-99-2	1	1	0.51	0.12	0.078 J	0.11 U	0.2	0.065 J	0.054 J	0.54	1.8	0.11 U	0.1 U	0.073 J	0.034 J	0.58	0.11 U	0.11 U	
Benzo(ghi)perylene	191-24-2	100	100	0.22	0.059 J	0.042 J	0.14 U	0.12 J	0.03 J	0.031 J	0.24	0.75	0.14 U	0.14 U	0.033 J	0.15 U	0.24	0.14 U	0.14 U	
Benzo(k)fluoranthene	207-08-9	0.8	3.9	0.16	0.037 J	0.11 U	0.11 U	0.068 J	0.11 U	0.11 U	0.19	0.53	0.11 U	0.1 U	0.13 U	0.11 U	0.22	0.11 U	0.11 U	
Benzoic Acid	65-85-0	NS	NS	0.59 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.6 U	0.59 U	0.57 U	0.68 U	0.59 U	0.61 U	0.59 U	0.59 U	
Benzyl Alcohol	100-51-6	NS	NS	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.21 U	0.18 U	0.19 U	0.18 U	0.18 U	
Biphenyl	92-52-4	NS	NS	0.42 U	0.4 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.12 J	0.42 U	0.4 U	0.48 U	0.42 U	0.029 J	0.41 U	1.7	
Bis(2-chloroethoxy)methane	111-91-1	NS	NS	0.2 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U	0.2 U	0.2 U	0.19 U	0.23 U	0.2 U	0.2 U	0.2 U	0.2 U	
Bis(2-chloroethyl)ether	111-44-4	NS	NS	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.17 U	0.16 U	0.16 U	0.19 U	0.16 U	0.17 U	0.16 U	0.16 U	
Bis(2-chloroisopropyl)ether	108-60-1	NS	NS	0.22 U	0.21 U	0.22 U	0.21 U	0.22 U	0.22 U	0.22 U	0.21 U	0.22 U	0.22 U	0.21 U	0.25 U	0.22 U	0.22 U	0.22 U	0.22 U	
Bis(2-ethylhexyl)phthalate	117-81-7	NS	NS	0.18 U	0.18 U	0.18 U	0.18 U	0.12 J	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.17 J	0.065 J	0.19 U	0.18 U	0.1 J	
Butyl benzyl phthalate	85-68-7	NS	NS	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.21 U	0.18 U	0.19 U	0.18 U	0.18 U	
Carbazole	86-74-8	NS	NS	0.067 J	0.18 U	0.18 U	0.18 U	0.04 J	0.18 U	0.18 U	0.098 J	0.43	0.18 U	0.18 U	0.21 U	0.18 U	0.14 J	0.18 U	0.18 U	
Chrysene	218-01-9	1	3.9	0.48	0.096 J	0.074 J	0.11 U	0.18	0.051 J	0.038 J	0.47	1.5	0.11 U	0.023 J	0.065 J	0.027 J	0.52	0.11 U	0.032 J	
Di-n-butylphthalate	84-74-2	NS	NS	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.21 U	0.18 U	0.19 U	0.18 U	0.18 U	
Di-n-octylphthalate	117-84-0	NS	NS	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.21 U	0.18 U	0.19 U	0.18 U	0.18 U	
Dibenzofuran	53-70-3	0.33	0.33	0.051 J	0.11 U	0.11 U	0.11 U	0.022 J	0.11 U	0.11 U	0.055 J	0.18	0.11 U	0.1 U	0.13 U	0.11 U	0.062 J	0.11 U	0.11 U	
Dibenzofuran	132-64-9	7	59	0.057 J	0.18 U	0.18 U	0.18 U	0.027 J	0.18 U	0.18 U	0.067 J	0.56	0.18 U	0.18 U	0.21 U	0.18 U	0.14 J	0.18 U	0.64	
Diethyl phthalate	84-66-2	NS	NS	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.21 U	0.18 U	0.19 U	0.18 U	0.18 U	
Dimethyl phthalate	131-11-3	NS	NS	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.21 U	0.18 U	0.19 U	0.18 U	0.18 U	
Fluoranthene	206-44-0	100	100	1.2	0.18	0.14	0.034 J	0.49	0.1 J	0.063 J	1	4	0.11 U	0.044 J	0.12 J	0.06 J	1.3	0.11 U	0.084 J	
Fluorene	86-73-7	30	100	0.055 J	0.18 U	0.18 U	0.18 U	0.026 J	0.18 U	0.18 U	0.073 J	0.3	0.18 U	0.18 U	0.21 U	0.046 J	0.12 J	0.18 U	1.5	
Hexachlorobenzene	118-74-1	0.33	1.2	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.1 U	0.13 U	0.11 U	0.11 U	0.11 U	0.11 U	
Hexachlorobutadiene	87-68-3	NS	NS	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.21 U	0.18 U	0.19 U	0.18 U	0.18 U	
Hexachlorocyclopentadiene	77-47-4																			

Notes:

(1) NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Unrestricted Use of Soil Cleanup Objective Ta

(2) NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Restricted Use of Soil Cleanup Objective Table

NS - No standard

NA - Not Analyzed

U - The compound was not detected at the indicated concentration

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

Shaded text denotes concentrations exceeding NYSDEC Unrestricted Use

Shaded text denotes concentrations exceeding NYSDEC Restricted Residential Use



Table 2  
Soil Metal Analytical Data  
1045-1065 Atlantic Avenue, Brooklyn, New York

Sample Area:	CAS Number	NYSDEC Unrestricted Use SCOs (1)	NYSDEC Restricted- Residential Use SCOs (2)	Track 4 Area									
Sample ID:				SW001	EP004	EP005	EP006	EP007	EP008	EP038	EP041	EP042	EP043
Sample Depth:				2'	2'	2'	2'	2'	2'	2'	2'	2'	2'
Sampling Date:				5/24/2023	5/22/2023	5/22/2023	5/22/2023	5/22/2023	5/22/2023	6/16/2023	7/5/2023	7/5/2023	7/5/2023
Lab Sample ID:				L2329121-02	L2328475-01	L2328475-02	L2328475-03	L2328475-04	L2328475-05	L2334612-01	L2338252-01	L2338252-02	L2338252-04
Total Metals by USEPA Method 6010C in mg/Kg													
Aluminum, Total	7429-90-5	NS	NS	4,800	9,120	6,680	6,710	7,850	8,250	6,160	10,900	11,800	5,300
Antimony, Total	7440-36-0	NS	NS	1.63 J	0.793 J	1.53 J	2.05 J	1.14 J	4.53	2.02 J	0.578 J	1.41 J	1.26 J
Arsenic, Total	7440-38-2	13	16	3.32	4.59	4.4	5.33	4.7	6.49	2.84	3.24	3.57	1.28
Barium, Total	7440-39-3	350	400	77.4	59.2	188	135	108	131	58.3	21.6	66.3	41.3
Beryllium, Total	7440-41-7	7.2	72	0.325 J	0.41 J	0.416 J	0.428 J	0.466	0.445	0.38 J	0.488 J	0.967	0.829
Cadmium, Total	7440-43-9	2.5	4.3	1.3	0.363 J	0.705 J	0.795 J	0.59 J	1.44	0.287 J	0.196 J	0.318 J	0.352 J
Calcium, Total	7440-70-2	NS	NS	4,190	5,100	11,900	17,000	14,000	7,040	4,410	813	1,170	903
Chromium, Total <sup>(3)</sup>	7440-47-3	30	180	23.8	18.1	23.4	27.6	23.6	30.9	34.3	16.7	18.7	18.7
Cobalt, Total	7440-48-4	NS	NS	4.67	6.08	5.36	12.1	5.97	6.01	5.23	7.4	5.87	6.12
Copper, Total	7440-50-8	50	270	59.3	20	42.8	76	43	74	31.8	12.7	13.4	18
Iron, Total	7439-89-6	NS	NS	12,300	22,800	16,100	22,500	19,200	20,900	18,400	20,500	18,200	19,800
Lead, Total	7439-92-1	63	400	216	162	874	394	317	516	256	8.32	34.4	13.3
Magnesium, Total	7439-95-4	NS	NS	2,050	2,170	2,910	3,330	2,820	2,310	1,980	2,320	2,440	1,760
Manganese, Total	7439-96-5	1,600	2,000	230	307	299	436	358	297	569	244	466	317
Mercury, Toal	7439-97-6	0.18	0.81	1.38	1.08	3	0.835	0.924	0.959	0.7	0.084 U	0.207	0.084 U
Nickel, Total	7440-02-0	30	310	23	16.3	20.7	21.1	17.2	33	12.2	13.2	12.8	15
Potassium, Total	7440-09-7	NS	NS	924	940	1,160	1,180	1,060	980	893	746	886	980
Selenium, Total	7782-49-2	3.9	180	0.33 J	0.551 J	0.634 J	0.837 J	0.613 J	0.609 J	0.242 J	0.49 J	1.92 U	1.75 U
Silver, Total	7440-22-4	2	180	0.443 U	0.429 U	0.457 U	0.445 U	0.437 U	0.268 J	0.441 U	0.499 U	0.48 U	0.439 U
Sodium, Total	7440-23-5	NS	NS	80.4 J	146 J	161 J	233	137 J	95.7 J	140 J	63.7 J	591	71.1 J
Thallium, Total	7440-28-0	NS	NS	1.77 U	0.44 J	0.466 J	0.552 J	0.502 J	0.449 J	0.544 J	0.368 J	1.92 U	1.75 U
Vanadium, Total	7440-62-2	NS	NS	18.9	25.9	20.4	26.3	22.3	23.8	20.1	26.4	24.5	31.3
Zinc, Total	7440-66-6	109	10,000	210	104	173	146	131	301	106	26.6	36.3	31.9

Notes:

(1) NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Unrestricted Use of Soil Cleanup Objective Table 375-6.8a 12/06

(2) NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Restricted Use of Soil Cleanup Objective Table 375-6.8b 12/06

(3) SCOs for Trivalent Chromium

NS - No standard

NA - Not Analyzed

J - Estimated Value

U - The compound was not detected at the indicated concentration.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

Shaded text denotes concentrations exceeding NYSDEC Unrestricted Use

Shaded text denotes concentrations exceeding NYSDEC Restricted Residential Use

Table 2  
Soil Metal Analytical Data  
1045-1065 Atlantic Avenue, Brooklyn, New York

Sample Area: Sample ID: Sample Depth: Sampling Date: Lab Sample ID:	CAS Number	NYSDEC Unrestricted Use SCO's (1)	NYSDEC Restricted- Residential Use SCO's (2)	EP001 15' 5/18/2023 L2327803-01	EP002 15' 5/19/2023 L2328139-02	EP003 15' 5/19/2023 L2328139-01	EP009 15' 5/23/2023 L2328760-01	EP010 15' 5/24/2023 L2329121-01	EP011 15' 5/25/2023 L2329677-01	EP012 15' 5/30/2023 L2329999-01	Track 2 Area EP013 15' 5/31/2023 L2330233-01	EP014 15' 5/31/2023 L2330233-02	EP015 15' 5/31/2023 L2330233-03	EP016 15' 5/31/2023 L2330233-04	EP017 15' 5/31/2023 L2330233-05	EP018 15' 5/31/2023 L2330233-06	EP019 15' 5/31/2023 L2330233-07	EP020 15' 6/1/2023 L2330617-03
Total Metals by USEPA Method 6010C in mg/Kg																		
Aluminum, Total	7429-90-5	NS	NS	6,000	7,040	5,630	7,340	5,400	4,990	5,890	6,100	5,050	5,840	5,800	4,670	4,430	8,240	5,410
Antimony, Total	7440-36-0	NS	NS	1.25 J	1.26 J	1.02 J	4.27 U	0.588 J	0.925 J	0.96 J	0.776 J	0.624 J	0.44 J	0.668 J	0.642 J	0.579 J	0.661 J	0.626 J
Arsenic, Total	7440-38-2	13	16	2.6	1.47	1.27	1.64	1.52	1.56	1.9	1.33	1.65	1.15	1.26	0.716 J	1.23	1.07	1.42
Barium, Total	7440-39-3	350	400	47.4	46.8	30.8	34.3	38.2	37	48.2	39.3	34	41	35.9	23.9	32.2	39.2	32.2
Beryllium, Total	7440-41-7	7.2	72	0.364	0.459	0.418 J	0.507	0.457	0.582	0.511	0.468	0.43 J	0.454	0.646	0.314 J	0.31 J	0.49	0.464
Cadmium, Total	7440-43-9	2.5	4.3	0.309 J	0.27 J	0.468 J	0.132 J	0.164 J	0.118 J	0.469 J	0.123 J	0.19 J	0.219 J	0.163 J	0.139 J	0.134 J	0.157 J	0.809 U
Calcium, Total	7440-70-2	NS	NS	2,770	633	174	544	615	837	479	768	757	1,760	492	756	896	805	611
Chromium, Total <sup>(3)</sup>	7440-47-3	30	180	33.6	792	93.8	21	18.8	14.2	162	19.2	19.9	16.7	17.8	12.6	10.2	15.6	13.7
Cobalt, Total	7440-48-4	NS	NS	3.98	5.86	5.73	6.01	4.98	6.27	4.39	5.72	5.22	5.6	6.33	3.12	4.16	5.09	5.02
Copper, Total	7440-50-8	50	270	27.7	83.7	32.4	15.8	13.6	14.6	44.1	13.9	28.6	18	12.9	19.6	9.32	17	12.2
Iron, Total	7439-89-6	NS	NS	15,000	15,300	16,700	18,300	16,400	20,800	22,800	17,800	17,400	21,000	21,100	22,100	18,900	23,600	16,000
Lead, Total	7439-92-1	63	400	71.9	4.86	4.46	7.46	5.61	5.31	7.5	8.51	12	27.7	5.62	9.52	15.8	7.56	5.89
Magnesium, Total	7439-95-4	NS	NS	1,520	1,820	1,460	1,850	1,600	1,580	1,670	1,740	1,490	1,900	1,550	1,300	1,390	1,870	1,560
Manganese, Total	7439-96-5	1,600	2,000	240	293	330	346	294	460	228	352	292	346	375	315	335	327	285
Mercury, Toal	7439-97-6	0.18	0.81	0.356	0.069 U	0.071 U	0.08 U	0.086 U	0.079 U	0.071 U	0.072 U	0.075 U	0.075	0.08 U	0.049 J	0.075 J	0.083 U	0.074 U
Nickel, Total	7440-02-0	30	310	13.5	21.1	13.5	14.3	11.2	13.5	19.5	12.4	13.1	12.3	20.6	9.11	10.3	15	11.2
Potassium, Total	7440-09-7	NS	NS	607	950	1,010	912	898	889	1,100	998	890	934	870	589	609	829	763
Selenium, Total	7782-49-2	3.9	180	1.66 U	1.69 U	1.7 U	1.71 U	0.325 J	1.7 U	1.71 U	1.7 U	1.73 U	1.71 U	1.73 U	0.227 J	0.263 J	1.7 U	1.62 U
Silver, Total	7440-22-4	2	180	0.414 U	0.424 U	0.425 U	0.427 U	0.437 U	0.425 U	0.429 U	0.424 U	0.433 U	0.427 U	0.433 U	0.414 U	0.408 U	0.424 U	0.405 U
Sodium, Total	7440-23-5	NS	NS	130 J	136 J	42.3 J	42.5 J	64.3 J	56.7 J	94.9 J	40.8 J	37.6 J	46.6 J	42.2 J	40.9 J	59.3 J	84 J	36.7 J
Thallium, Total	7440-28-0	NS	NS	1.66 U	0.779 J	0.747 J	0.571 J	0.455 J	1.7 U	0.293 J	0.437 J	0.442 J	0.49 J	0.481 J	0.386 J	0.447 J	0.52 J	0.423 J
Vanadium, Total	7440-62-2	NS	NS	19	30.7	23.5	26.7	30.9	23.9	27.9	24.7	30.5	26.3	29.2	18.6	17.2	25.6	23
Zinc, Total	7440-66-6	109	10,000	64.3	28.4	30	25.9	22.4	30.5	37.1	26.5	30.8	40.5	34.9	20.1	26.7	27.6	23.8

Notes:

(1) NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Unrestricted Use of Soil Cleanup Obje

(2) NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Restricted Use of Soil Cleanup Object

(3) SCO's for Trivalent Chromium

NS - No standard

NA - Not Analyzed

J - Estimated Value

U - The compound was not detected at the indicated concentration.

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Shaded text denotes concentrations exceeding NYSDEC Unrestricted Use

Shaded text denotes concentrations exceeding NYSDEC Restricted Residential Use

Table 2  
Soil Metal Analytical Data  
1045-1065 Atlantic Avenue, Brooklyn, New York

Sample Area:	CAS Number	NYSDEC Unrestricted Use SCOs (1)	NYSDEC Restricted- Residential Use SCOs (2)	Track 2 Area														
Sample ID:				EP021	EP022	EP023	EP024	EP025	EP026	EP027	EP028	EP029	EP030	EP031	EP032	EP033	EP034	
Sample Depth:				15'	15'	15'	15'	15'	15'	15'	15'	15'	15'	15'	15'	15'	15'	
Sampling Date:				6/5/2023	6/1/2023	6/5/2023	6/5/2023	6/5/2023	6/5/2023	6/5/2023	6/5/2023	6/5/2023	6/5/2023	6/5/2023	6/6/2023	6/6/2023	6/6/2023	6/12/2023
Lab Sample ID:				L2331251-01	L2330617-01	L2331251-02	L2331251-03	L2331251-04	L2331251-05	L2331251-06	L2331251-07	L2331251-09	L2331251-10	L2331476-01	L2331476-02	L2331476-03	L2333318-01	
Total Metals by USEPA Method 6010C in mg/Kg																		
Aluminum, Total	7429-90-5	NS	NS	6,170	6,400	6,320	5,330	5,200	6,700	6,030	6,610	6,620	5,020	6,670	6,880	7,000	7,440	
Antimony, Total	7440-36-0	NS	NS	1.09 J	0.98 J	0.898 J	0.933 J	0.896 J	1.11 J	1.08 J	1.15 J	1.05 J	0.945 J	0.575 J	0.911 J	0.482 J	1.11 J	
Arsenic, Total	7440-38-2	13	16	1.83	2.13	1.94	1.64	1.99	2.98	1.98	2.17	2.26	1.69	2.23	2.69	1.96	1.61	
Barium, Total	7440-39-3	350	400	36.1	40.2	41	31.5	31.8	46	41.3	41.8	43.2	35.3	37.9	42.4	34.7	42.6	
Beryllium, Total	7440-41-7	7.2	72	0.605	0.624	0.584	0.494	0.479	0.626	0.552	0.658	0.634	0.488	0.45	0.448	0.419 J	0.519	
Cadmium, Total	7440-43-9	2.5	4.3	0.175 J	0.147 J	0.263 J	0.169 J	0.162 J	0.209 J	0.827 J	0.216 J	0.321 J	0.159 J	0.772 J	0.639 J	0.342 J	0.185 J	
Calcium, Total	7440-70-2	NS	NS	848	862	1,000	715	765	777	1,260	1,410	430	995	1,780	2,990	831	822	
Chromium, Total <sup>(3)</sup>	7440-47-3	30	180	18.4	18.4	26.2	17.3	14.3	14.8	27.6	45	19.6	15.8	27.2	22.2	19.3	25.8	
Cobalt, Total	7440-48-4	NS	NS	6.82	6.74	6.62	5.74	5.65	6.32	6.35	7.39	6.2	6.17	6.29	5.85	6.45	6.41	
Copper, Total	7440-50-8	50	270	16.7	17.7	18.8	16.9	13.5	14.3	22.8	21.3	22.8	14.5	27.9	33.8	21.5	14.7	
Iron, Total	7439-89-6	NS	NS	19,600	23,800	17,800	15,900	16,700	20,600	17,100	21,000	20,800	16,700	19,400	19,400	17,200	21,700	
Lead, Total	7439-92-1	63	400	8.62	13.5	10.8	7.7	8.88	7.97	33.6	10.1	6.4	7.24	13.7	74.9	13.3	7.83	
Magnesium, Total	7439-95-4	NS	NS	2,250	1,920	2,100	1,720	1,980	2,500	2,120	2,380	1,980	1,780	1,990	3,220	1,730	2,120	
Manganese, Total	7439-96-5	1,600	2,000	394	469	357	335	319	418	329	397	397	299	371	330	372	443	
Mercury, Toal	7439-97-6	0.18	0.81	0.071 U	0.071 U	0.075 U	0.079 U	0.07 U	0.082 U	0.081 U	0.07 U	0.081 U	0.072 U	0.071 U	0.117	0.118	0.079 U	
Nickel, Total	7440-02-0	30	310	14.9	14.9	16.9	14.5	13.4	14.2	25.1	18.9	30	15.3	28.4	22.3	14.8	14.8	
Potassium, Total	7440-09-7	NS	NS	1,050	973	1,280	914	922	1,130	1,220	1,430	1,230	904	1,120	1,090	1,050	1,090	
Selenium, Total	7782-49-2	3.9	180	1.74 U	1.62 U	1.71 U	1.68 U	1.72 U	1.68 U	1.69 U	1.66 U	1.7 U	1.71 U	0.42 J	0.58 J	1.68 U	0.29 J	
Silver, Total	7440-22-4	2	180	0.436 U	0.405 U	0.427 U	0.419 U	0.43 U	0.421 U	0.422 U	0.416 U	0.425 U	0.428 U	0.278 J	0.275 J	0.421 U	0.412 U	
Sodium, Total	7440-23-5	NS	NS	40.1 J	51.5 J	31 J	18.2 J	72.6 J	73.8 J	46.6 J	42.3 J	37 J	117 J	114 J	92.7 J	70.3 J	150 J	
Thallium, Total	7440-28-0	NS	NS	0.786 J	0.354 J	0.796 J	0.613 J	0.77 J	1.68 U	0.671 J	0.672 J	0.594 J	0.512 J	0.616 J	0.457 J	0.566 J	0.684 J	
Vanadium, Total	7440-62-2	NS	NS	27.9	30.5	28.6	23.8	22.4	28.7	25	32.9	28.3	25.2	28	31.2	30	28.8	
Zinc, Total	7440-66-6	109	10,000	31	32.9	32.8	26.5	29.3	38.1	44	37.2	33.4	27.8	40.9	62.1	45.1	32	

Notes:  
(1) NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Unrestricted Use of Soil Cleanup Object  
(2) NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Restricted Use of Soil Cleanup Object  
(3) SCOs for Trivalent Chromium  
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Shaded text denotes concentrations exceeding NYSDEC Unrestricted Use  
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Table 2  
Soil Metal Analytical Data  
1045-1065 Atlantic Avenue, Brooklyn, New York

Sample Area: Sample ID: Sample Depth: Sampling Date: Lab Sample ID:	CAS Number	NYSDEC Unrestricted Use SCOs (1)	NYSDEC Restricted- Residential Use SCOs (2)	EP035 15' 6/13/2023 L23333318-03	EP036 15' 6/15/2023 L2334071-06	EP037 15' 6/15/2023 L2334071-05	EP039 15' 6/16/2023 L2334612-02	EP040 15' 6/21/2023 L2335832-01	EP044 15' 7/6/2023 L2338463-02	EP045 15' 7/6/2023 L2338463-03	Track 2 Area EP046 15' 7/6/2023 L2338463-04	EP047 15' 7/7/2023 L2338846-02	EP048 15' 7/7/2023 L2338846-03	EP049 15' 7/7/2023 L2338846-04	EP050 15' 7/13/2023 L2340134-01	EP051 15' 7/17/2023 L2340787-01	EP052 15' 7/20/2023 L2341724-01	EP053 15' 7/25/2023 L2342666-01
Total Metals by USEPA Method 6010C in mg/Kg																		
Aluminum, Total	7429-90-5	NS	NS	7,190	6,130	7,040	7,040	6,560	4,360	5,620	5,610	6,910	5,480	7,470	6,780	7,270	7,430	5,340
Antimony, Total	7440-36-0	NS	NS	0.743 J	0.518 J	0.622 J	0.832 J	0.84 J	0.864 J	1.18 J	1.27 J	1.14 J	0.573 J	0.853 J	0.369 J	1.14 J	0.791 J	4.24 U
Arsenic, Total	7440-38-2	13	16	2.23	1.39	1.51	1.99	2.1	1.14	4.69	1.86	2.21	1.41	1.76	2.41	3	2.7	1.58
Barium, Total	7440-39-3	350	400	41.6	40.2	44.1	37.9	42.1	32.9	43.1	44.1	48.9	49.2	52.9	29.4	41.9	41.4	39.2
Beryllium, Total	7440-41-7	7.2	72	0.458	0.448	0.515	0.447	0.484	0.758	1.03	0.78	1.07	1.01	1.14	0.305 J	0.479	0.281 J	0.343 J
Cadmium, Total	7440-43-9	2.5	4.3	0.169 J	0.211 J	0.186 J	0.347 J	0.23 J	0.337 J	0.486 J	0.431 J	0.556 J	0.288 J	0.35 J	0.864 U	0.234 J	0.5 J	0.102 J
Calcium, Total	7440-70-2	NS	NS	2,390	993	1,100	926	544	1,120	954	2,020	8,880	1,390	941	596	1,700	403	852
Chromium, Total <sup>(3)</sup>	7440-47-3	30	180	22.5	27.4	20.2	22.9	22.1	15.3	18.6	27.6	29.6	15.5	19.4	16	27.6	21.1	16.3
Cobalt, Total	7440-48-4	NS	NS	5.29	5.91	6.16	6.3	6.54	5.38	6.45	5.24	6.79	7.85	6.49	5.43	5.82	6.28	5.14
Copper, Total	7440-50-8	50	270	22.2	20.3	18.8	21.8	20.9	14.7	18	21.5	28.1	19.3	21.5	14.9	19.2	17.8	14.9
Iron, Total	7439-89-6	NS	NS	21,000	19,100	22,400	19,400	18,800	12,900	20,200	15,200	22,400	16,200	20,400	14,900	20,600	22,100	17,300
Lead, Total	7439-92-1	63	400	29.8	14.8	12.4	9.73	13	13	12.8	66.9	81.8	8.33	14.9	8.41	52.6	5.32	7.51
Magnesium, Total	7439-95-4	NS	NS	1,800	1,720	2,990	2,220	2,050	1,760	1,760	1,640	2,250	3,280	1,970	1,950	2,420	1,900	1,580
Manganese, Total	7439-96-5	1,600	2,000	292	391	383	465	354	276	433	320	360	376	349	181	343	366	284
Mercury, Toal	7439-97-6	0.18	0.81	0.075 U	0.07 U	0.069 U	0.081 U	0.069 U	0.1	0.077 U	0.278	0.154	0.077 U	0.102 U	0.085 U	0.095	0.078 U	0.07 U
Nickel, Total	7440-02-0	30	310	12.9	15.1	19.7	15.1	17.1	16.9	14.5	20.5	22.9	28.5	15.3	13.7	16.9	15.1	12.3
Potassium, Total	7440-09-7	NS	NS	985	1,060	1,370	1,210	1,880	882	1,070	851	1,090	1,280	1,360	629	1,630	1,630	1,080
Selenium, Total	7782-49-2	3.9	180	0.353 J	1.7 U	1.73 U	0.278 J	0.293 J	1.66 U	1.7 U	1.65 U	1.74 U	1.7 U	1.94 U	1.73 U	1.77 U	1.71 U	1.7 U
Silver, Total	7440-22-4	2	180	0.421 U	0.426 U	0.433 U	0.342 J	0.432 U	0.414 U	0.424 U	0.413 U	0.434 U	0.424 U	0.486 U	0.432 U	0.443 U	0.427 U	0.424 U
Sodium, Total	7440-23-5	NS	NS	69.6 J	132 J	75 J	111 J	63.9 J	100 J	102 J	105 J	119 J	103 J	99.6 J	56.6 J	97.8 J	47 J	58.8 J
Thallium, Total	7440-28-0	NS	NS	0.384 J	0.594 J	0.679 J	0.49 J	0.424 J	1.66 U	1.7 U	1.65 U	1.74 U	1.7 U	1.94 U	0.478 J	1.77 U	0.43 J	0.653 J
Vanadium, Total	7440-62-2	NS	NS	25.1	25.7	25.7	31.2	28.1	18.1	26.2	21	27.8	21.8	26.8	25.4	26.6	30.9	25.4
Zinc, Total	7440-66-6	109	10,000	40.9	36.1	37.6	33.8	33.2	26.6	33.3	46.5	56.7	32.9	36.5	29.6	38.9	47.6	26.7

Notes:  
(1) NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Unrestricted Use of Soil Cleanup Object  
(2) NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Restricted Use of Soil Cleanup Object  
(3) SCOs for Trivalent Chromium  
NS - No standard  
NA - Not Analyzed  
J - Estimated Value  
U - The compound was not detected at the indicated concentration.  
E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument  
Shaded text denotes concentrations exceeding NYSDEC Unrestricted Use  
Shaded text denotes concentrations exceeding NYSDEC Restricted Residential Use



Table 3  
Soil Vapor / Ambient Air VOC Analytical Data  
1045-1065 Atlantic Avenue, Brooklyn, New York

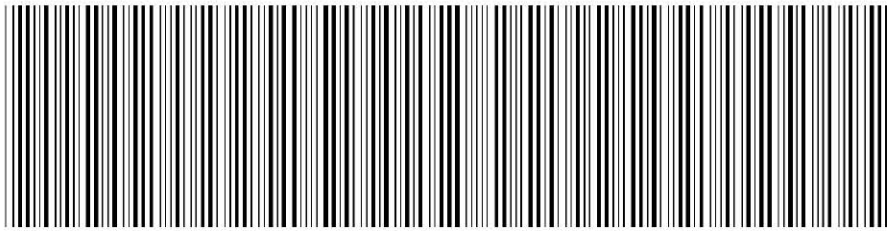
Sample Type:		Sub-Slab Vapor										Ambient Air		
Sample ID:	CAS Number	SS006 2"	SS007 2"	SS008 2"	SS009 2"	SS010 2"	SS011 2"	SS012 2"	SS013 2"	SS014 2"	SS015 2"	IA001 N/A	OA001 N/A	OA002 N/A
Sampling Depth:		8/19/2021	8/19/2021	8/19/2021	8/19/2021	8/19/2021	8/19/2021	8/19/2021	8/19/2021	8/19/2021	8/19/2021	8/19/2021	8/19/2021	8/19/2021
Sampling Date:		L2144960-07	L2144960-08	L2144960-09	L2144960-10	L2144960-11	L2144960-12	L2144960-13	L2144960-14	L2144960-15	L2144960-16	L2144960-18	L2144960-17	L2144960-19
Lab Sample ID:														
Volatile Organics in Air in µg/m3														
1,1,1-Trichloroethane	71-55-6	38.6 U	31.3 U	1.52 U	1.09 U	1.09 U	1.09 U	1.09 U	1.09 U	6.82 U	111	-	-	-
1,1,2,2-Tetrachloroethane	630-20-6	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
1,1,2,2-Tetrachloroethane	79-34-5	48.6 U	39.3 U	1.91 U	1.37 U	1.37 U	1.37 U	1.37 U	1.37 U	8.58 U	7.62 U	1.37 U	1.37 U	1.37 U
1,1,2-Trichloroethane	79-00-5	38.6 U	31.3 U	1.52 U	1.09 U	1.09 U	1.09 U	1.09 U	1.09 U	6.82 U	6.06 U	1.09 U	1.09 U	1.09 U
1,1-Dichloroethane	75-34-3	28.6 U	23.2 U	1.13 U	0.809 U	0.809 U	0.809 U	0.809 U	0.809 U	5.06 U	4.49 U	0.809 U	0.809 U	0.809 U
1,1-Dichloroethene	75-35-4	28 U	22.7 U	1.1 U	0.793 U	0.793 U	0.793 U	0.793 U	0.793 U	4.96 U	4.4 U	-	-	-
1,2,4-Trichlorobenzene	120-82-1	52.5 U	42.5 U	2.06 U	1.48 U	1.48 U	1.48 U	1.48 U	1.48 U	9.28 U	8.24 U	1.48 U	1.48 U	1.48 U
1,2,4-Trimethylbenzene	95-63-6	34.8 U	28.2 U	10	5.6	8.5	9.68	5.46	8.36	6.15 U	12.6	0.983 U	0.983 U	0.983 U
1,2-Dibromoethane	106-93-4	54.3 U	44 U	2.14 U	1.54 U	1.54 U	1.54 U	1.54 U	1.54 U	9.61 U	8.53 U	1.54 U	1.54 U	1.54 U
1,2-Dichlorobenzene	95-50-1	42.5 U	34.5 U	1.67 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	7.52 U	6.67 U	1.2 U	1.2 U	1.2 U
1,2-Dichloroethane	107-06-2	28.6 U	23.2 U	1.13 U	0.809 U	0.809 U	0.809 U	0.809 U	7.04	5.06 U	4.49 U	0.809 U	0.809 U	0.809 U
1,2-Dichloropropane	78-87-5	32.7 U	26.5 U	1.28 U	0.924 U	0.924 U	0.924 U	0.924 U	0.924 U	5.78 U	5.13 U	0.924 U	0.924 U	0.924 U
1,3,5-Trimethylbenzene	108-67-8	34.8 U	28.2 U	3.18	1.47	2.62	2.6	1.64	2.3	6.15 U	5.46 U	0.983 U	0.983 U	0.983 U
1,3-Butadiene	106-99-0	15.6 U	12.7 U	0.615 U	0.442 U	0.489	0.442 U	0.442 U	0.442 U	2.77 U	2.46 U	0.442 U	0.442 U	0.442 U
1,3-Dichlorobenzene	541-73-1	42.5 U	34.5 U	1.67 U	42	1.2 U	36.4	35.8	35	7.52 U	23.4	1.2 U	1.2 U	1.2 U
1,3-Dichloropropane	142-28-9	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
1,4-Dichlorobenzene	106-46-7	42.5 U	34.5 U	1.67 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	7.52 U	6.67 U	1.2 U	1.2 U	1.2 U
1,4-Dioxane	123-91-1	25.5 U	20.6 U	1 U	0.721 U	0.721 U	0.721 U	0.721 U	0.721 U	4.5 U	4 U	0.721 U	0.721 U	0.721 U
2,2,4-Trimethylpentane	540-84-1	33 U	26.8 U	5.51	2.48	14.7	5.79	1.66	1.35	5.84 U	5.18 U	0.934 U	0.934 U	0.934 U
2-Butanone	78-93-3	52.2 U	42.2 U	3.33	1.88	4.81	2.01	2.58	1.47 U	9.2 U	8.2 U	1.47 U	1.47 U	1.47 U
2-Hexanone	591-78-6	29 U	23.5 U	1.14 U	0.82 U	0.82 U	0.82 U	0.82 U	0.82 U	5.12 U	4.55 U	0.82 U	0.82 U	0.82 U
3-Chloropropene	107-05-1	22.1 U	17.9 U	0.87 U	0.626 U	0.626 U	0.626 U	0.626 U	0.626 U	3.91 U	3.47 U	0.626 U	0.626 U	0.626 U
4-Ethyltoluene	622-96-8	34.8 U	28.2 U	2.76	1.51	2.46	2.49	1.6	2.22	6.15 U	5.46 U	0.983 U	0.983 U	0.983 U
4-Methyl-2-pentanone	108-10-1	72.5 U	58.6 U	2.84 U	2.05 U	2.05 U	2.05 U	2.05 U	2.05 U	12.8 U	11.4 U	2.05 U	2.05 U	2.05 U
Acetone	67-64-1	84.1 U	67.9 U	63.7	29.2	44.2	44.7	26.6	18.4	19.2	23.7	3.85	32.3	8.43
Acrylonitrile	107-13-1	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Benzene	71-43-2	22.6 U	18.3 U	2.43	0.949	4.44	0.965	0.722	0.655	3.99 U	3.55 U	0.639 U	0.639 U	0.639 U
Benzyl chloride	100-44-7	36.6 U	29.7 U	1.44 U	1.04 U	1.04 U	1.04 U	1.04 U	1.04 U	6.47 U	5.75 U	1.04 U	1.04 U	1.04 U
Bromodichloromethane	75-27-4	47.4 U	38.4 U	1.86 U	1.34 U	1.34 U	1.34 U	1.34 U	1.34 U	8.37 U	7.44 U	1.34 U	1.34 U	1.34 U
Bromoform	75-25-2	73.1 U	59.2 U	2.87 U	2.07 U	2.07 U	2.07 U	2.07 U	2.07 U	12.9 U	11.5 U	2.07 U	2.07 U	2.07 U
Bromomethane	74-83-9	27.5 U	22.2 U	1.08 U	0.777 U	0.777 U	0.777 U	0.777 U	0.777 U	4.85 U	4.31 U	0.777 U	0.777 U	0.777 U
Carbon disulfide	75-15-0	22 U	17.8 U	0.866 U	0.623 U	0.623 U	0.623 U	0.623 U	0.623 U	3.89 U	3.46 U	0.623 U	0.623 U	0.623 U
Carbon tetrachloride	56-23-5	44.5 U	36 U	1.75 U	1.26 U	1.26 U	1.26 U	1.26 U	1.26 U	7.86 U	6.98 U	-	-	-
Chlorobenzene	108-90-7	32.6 U	26.4 U	1.28 U	0.921 U	0.921 U	0.921 U	0.921 U	0.921 U	5.76 U	5.11 U	0.921 U	0.921 U	0.921 U
Chloroethane	75-00-3	18.7 U	15.1 U	0.734 U	0.528 U	0.528 U	0.528 U	0.528 U	0.528 U	3.3 U	2.93 U	0.528 U	0.528 U	0.528 U
Chloroform	67-66-3	34.5 U	28 U	28.3	0.977 U	3.61	0.977 U	12.9	2.68	6.1 U	5.42 U	3.98	0.977 U	0.977 U
Chloromethane	74-87-3	14.6 U	11.8 U	0.574 U	0.946	0.63	0.413 U	0.413 U	0.413 U	2.58 U	2.29 U	0.805	0.973	1.07
cis-1,2-Dichloroethene	156-59-2	35	22.7 U	1.1 U	0.793 U	0.793 U	0.793 U	0.793 U	0.793 U	5.67	4.4 U	-	-	-
cis-1,3-Dichloropropene	10061-01-5	32.1 U	26 U	1.26 U	0.908 U	0.908 U	0.908 U	0.908 U	0.908 U	5.67 U	5.04 U	0.908 U	0.908 U	0.908 U
Cyclohexane	110-82-7	24.3 U	19.7 U	1.71	0.833	2.94	0.788	2.14	0.688 U	4.3 U	3.82 U	0.688 U	0.688 U	0.688 U
Dibromochloromethane	124-48-1	60.2 U	48.8 U	2.37 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	10.6 U	9.46 U	1.7 U	1.7 U	1.7 U
Dichlorodifluoromethane	75-71-8	35 U	28.3 U	2.27	2.29	2.53	2.25	3.03	4.04	6.72	5.49 U	2.03	2.04	2.05
Ethanol	64-17-5	334 U	269 U	13.1 U	9.42 U	9.42 U	9.42 U	9.42 U	9.42 U	58.8 U	52.4 U	9.42 U	12.7	12.7
Ethyl Acetate	141-78-6	63.8 U	51.5 U	2.5 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	11.2 U	10 U	1.8 U	1.8 U	1.8 U
Ethylbenzene	100-41-4	30.7 U	24.9 U	11.7	5.26	9.95	6.6	5.82	5.52	5.43 U	9.95	0.869 U	1.36	1.1
Freon-113	76-13-1	54.2 U	43.9 U	2.13 U	1.53 U	1.53 U	1.53 U	1.53 U	1.53 U	9.58 U	8.51 U	1.53 U	1.53 U	1.53 U
Freon-114	76-14-2	49.4 U	40.1 U	1.94 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	8.74 U	7.76 U	1.4 U	1.4 U	1.4 U
Heptane	142-82-5	29 U	23.5 U	4.14	4.22	6.8	3.61	3.82	3.36	5.12 U	5.08	0.82 U	0.869	0.82 U
Hexachlorobutadiene	87-68-3	75.4 U	61.1 U	2.97 U	2.13 U	2.13 U	2.13 U	2.13 U	2.13 U	13.3 U	11.8 U	2.13 U	2.13 U	2.13 U
Isopropanol	67-63-0	43.5 U	35.2 U	1.71 U	1.85	1.8	1.23 U	1.23 U	1.23 U	7.67 U	6.83 U	2.83	1.47	3.86
Methyl Methacrylate	80-62-6	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Methyl tert butyl ether	1634-04-4	25.5 U	20.7 U	1 U	0.721 U	0.721 U	0.721 U	0.721 U	0.721 U	4.51 U	4 U	0.721 U	0.721 U	0.721 U
Methylene chloride	75-09-2	61.5 U	49.7 U	2.41 U	1.74 U	1.98	1.74 U	6.53	8.86	10.8 U	9.66 U	2.78	1.97	5.7
n-Heptane	142-82-5	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
n-Hexane	110-54-3	24.9 U	20.2 U	4.19	3.59	8.46	2.61	21	3.14	4.41 U	4.48	0.772	1	0.952
o-Xylene	95-47-6	30.7 U	24.9 U	14.7	10.1	13.7	12.2	11.1	10.3	5.43 U	14.8	0.869 U	1.22	0.869 U
p/m-Xylene	179601-23-1	61.2 U	49.5 U	39.7	33.1	40	38.9	35.3	33.2	10.9 U	47.3	1.89	4.73	3.91
p-Ethyltouene	622-96-8	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Propylene	115-07-01	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Styrene	100-42-5	30.1 U	24.4 U	5.07	3.74	1.64	3.85							

**APPENDIX A**  
**ENVIRONMENTAL EASEMENT**



**NYC DEPARTMENT OF FINANCE  
OFFICE OF THE CITY REGISTER**

This page is part of the instrument. The City Register will rely on the information provided by you on this page for purposes of indexing this instrument. The information on this page will control for indexing purposes in the event of any conflict with the rest of the document.



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**RECORDING AND ENDORSEMENT COVER PAGE**

**PAGE 1 OF 10**

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**PRESENTER:**

SIVE PAGET & RIESEL, P.C.  
560 LEXINGTON AVENUE, 15TH FLOOR  
NEW YORK, NY 10022  
212-421-2150  
NDUNCAN@SPRLAW.COM

**RETURN TO:**

SIVE PAGET & RIESEL, P.C.  
560 LEXINGTON AVENUE, 15TH FLOOR  
NEW YORK, NY 10022  
212-421-2150  
NDUNCAN@SPRLAW.COM

**PROPERTY DATA**

Borough	Block	Lot	Unit	Address
BROOKLYN	2020	68	Entire Lot	1065 ATLANTIC AVENUE
<b>Property Type:</b> COMMERCIAL REAL ESTATE Easement				

**CROSS REFERENCE DATA**

CRFN \_\_\_\_\_ or DocumentID \_\_\_\_\_ or \_\_\_\_\_ Year \_\_\_\_\_ Reel \_\_\_\_\_ Page \_\_\_\_\_ or File Number \_\_\_\_\_

**PARTIES**

**GRANTOR/SELLER:**

1065 ATLANTIC AVENUE LLC  
42-09 235TH STREET  
DOUGLSTON, NY 10363

**GRANTEE/BUYER:**

PEOPLE OF STATE OF NEW YORK BY DEPT.  
ENVIRONMENTAL  
625 BROADWAY  
ALBANY, NY 12233

**FEES AND TAXES**

**Mortgage :**

Mortgage Amount: \$ 0.00

Taxable Mortgage Amount: \$ 0.00

Exemption:

TAXES: County (Basic): \$ 0.00

City (Additional): \$ 0.00

Spec (Additional): \$ 0.00

TASF: \$ 0.00

MTA: \$ 0.00

NYCTA: \$ 0.00

Additional MRT: \$ 0.00

**TOTAL:** \$ 0.00

Recording Fee: \$ 82.00

Affidavit Fee: \$ 0.00

**Filing Fee:**

\$ 100.00

NYC Real Property Transfer Tax:

\$ 0.00

NYS Real Estate Transfer Tax:

\$ 0.00

**RECORDED OR FILED IN THE OFFICE  
OF THE CITY REGISTER OF THE**

**CITY OF NEW YORK**

Recorded/Filed 11-21-2023 12:04

City Register File No.(CRFN):

**2023000304718**



*Colette McChia-Jacques*

**City Register Official Signature**



**ENVIRONMENTAL EASEMENT GRANTED PURSUANT TO ARTICLE 71, TITLE 36  
OF THE NEW YORK STATE ENVIRONMENTAL CONSERVATION LAW**

**THIS INDENTURE** made this 10th day of November, 2023, between Owner, 1065 Atlantic Avenue LLC, having an office at 7 Penn Plaza, Suite 600, New York, NY 10001 (the "Grantor"), and The People of the State of New York (the "Grantee."), acting through their Commissioner of the Department of Environmental Conservation (the "Commissioner", or "NYSDEC" or "Department" as the context requires) with its headquarters located at 625 Broadway, Albany, New York 12233,

**WHEREAS**, the Legislature of the State of New York has declared that it is in the public interest to encourage the remediation of abandoned and likely contaminated properties ("sites") that threaten the health and vitality of the communities they burden while at the same time ensuring the protection of public health and the environment; and

**WHEREAS**, the Legislature of the State of New York has declared that it is in the public interest to establish within the Department a statutory environmental remediation program that includes the use of Environmental Easements as an enforceable means of ensuring the performance of operation, maintenance, and/or monitoring requirements and the restriction of future uses of the land, when an environmental remediation project leaves residual contamination at levels that have been determined to be safe for a specific use, but not all uses, or which includes engineered structures that must be maintained or protected against damage to perform properly and be effective, or which requires groundwater use or soil management restrictions; and

**WHEREAS**, the Legislature of the State of New York has declared that Environmental Easement shall mean an interest in real property, created under and subject to the provisions of Article 71, Title 36 of the New York State Environmental Conservation Law ("ECL") which contains a use restriction and/or a prohibition on the use of land in a manner inconsistent with engineering controls which are intended to ensure the long term effectiveness of a site remedial program or eliminate potential exposure pathways to hazardous waste or petroleum; and

**WHEREAS**, Grantor, is the owner of real property located at the address of 1045 – 1065 Atlantic Avenue, in the City of New York, County of Kings and State of New York, known and designated on the tax map of the New York City Department of Finance as tax map parcel number: Block 2020 Lot 68, being the same as that property conveyed to Grantor by deed dated May 26, 2023, and recorded in the City Register of the City of New York as CRFN # 2023000139221. The property subject to this Environmental Easement (the "Controlled Property") comprises approximately 1.081 +/- acres, and is hereinafter more fully described in the Land Title Survey dated May 25, 2023 prepared by Arkadiusz Jusiega, P.L.S. (License No. 050569), Arek Surveying P.C., which will be attached to the Site Management Plan. The Controlled Property description is set forth in and attached hereto as Schedule A; and

**WHEREAS**, the Department accepts this Environmental Easement in order to ensure the protection of public health and the environment and to achieve the requirements for remediation established for the Controlled Property until such time as this Environmental Easement is extinguished pursuant to ECL Article 71, Title 36; and

**NOW THEREFORE**, in consideration of the mutual covenants contained herein and the terms and conditions of Brownfield Cleanup Agreement Index Number: C224305-06-20, Grantor conveys to Grantee a permanent Environmental Easement pursuant to ECL Article 71, Title 36 in, on, over, under, and upon the Controlled Property as more fully described herein ("Environmental Easement").

1. Purposes. Grantor and Grantee acknowledge that the Purposes of this Environmental Easement are: to convey to Grantee real property rights and interests that will run with the land in perpetuity in order to provide an effective and enforceable means of encouraging the reuse and redevelopment of this Controlled Property at a level that has been determined to be safe for a specific use while ensuring the performance of operation, maintenance, and/or monitoring requirements; and to ensure the restriction of future uses of the land that are inconsistent with the above-stated purpose.

2. Institutional and Engineering Controls. The controls and requirements listed in the Department approved Site Management Plan ("SMP") including any and all Department approved amendments to the SMP are incorporated into and made part of this Environmental Easement. These controls and requirements apply to the use of the Controlled Property, run with the land, are binding on the Grantor and the Grantor's successors and assigns, and are enforceable in law or equity against any owner of the Controlled Property, any lessees and any person using the Controlled Property.

A. (1) The Controlled Property may be used for:

**Restricted Residential as described in 6 NYCRR Part 375-1.8(g)(2)(ii),  
Commercial as described in 6 NYCRR Part 375-1.8(g)(2)(iii) and Industrial  
as described in 6 NYCRR Part 375-1.8(g)(2)(iv)**

(2) All Engineering Controls must be operated and maintained as specified in the Site Management Plan (SMP);

(3) All Engineering Controls must be inspected at a frequency and in a manner defined in the SMP;

(4) The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the New York City Department of Health and Mental Hygiene to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department;

(5) Groundwater and other environmental or public health monitoring must be performed as defined in the SMP;

(6) Data and information pertinent to Site Management of the Controlled Property must be reported at the frequency and in a manner defined in the SMP;

(7) All future activities on the property that will disturb remaining

contaminated material must be conducted in accordance with the SMP;

(8) Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in the SMP;

(9) Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical components of the remedy shall be performed as defined in the SMP;

(10) Access to the site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by this Environmental Easement.

B. The Controlled Property shall not be used for Residential purposes as defined in 6NYCRR 375-1.8(g)(2)(i), and the above-stated engineering controls may not be discontinued without an amendment or extinguishment of this Environmental Easement.

C. The SMP describes obligations that the Grantor assumes on behalf of Grantor, its successors and assigns. The Grantor's assumption of the obligations contained in the SMP which may include sampling, monitoring, and/or operating a treatment system, and providing certified reports to the NYSDEC, is and remains a fundamental element of the Department's determination that the Controlled Property is safe for a specific use, but not all uses. The SMP may be modified in accordance with the Department's statutory and regulatory authority. The Grantor and all successors and assigns, assume the burden of complying with the SMP and obtaining an up-to-date version of the SMP from:

Site Control Section  
Division of Environmental Remediation  
NYSDEC  
625 Broadway  
Albany, New York 12233  
Phone: (518) 402-9553

D. Grantor must provide all persons who acquire any interest in the Controlled Property a true and complete copy of the SMP that the Department approves for the Controlled Property and all Department-approved amendments to that SMP.

E. Grantor covenants and agrees that until such time as the Environmental Easement is extinguished in accordance with the requirements of ECL Article 71, Title 36 of the ECL, the property deed and all subsequent instruments of conveyance relating to the Controlled Property shall state in at least fifteen-point bold-faced type:

**This property is subject to an Environmental Easement held by the New York State Department of Environmental Conservation pursuant to Title 36 of Article 71 of the Environmental Conservation**

## Law.

F. Grantor covenants and agrees that this Environmental Easement shall be incorporated in full or by reference in any leases, licenses, or other instruments granting a right to use the Controlled Property.

G. Grantor covenants and agrees that it shall, at such time as NYSDEC may require, submit to NYSDEC a written statement by an expert the NYSDEC may find acceptable certifying under penalty of perjury, in such form and manner as the Department may require, that:

(1) the inspection of the site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under the direction of the individual set forth at 6 NYCRR Part 375-1.8(h)(3).

(2) the institutional controls and/or engineering controls employed at such site:

(i) are in-place;

(ii) are unchanged from the previous certification, or that any identified changes to the controls employed were approved by the NYSDEC and that all controls are in the Department-approved format; and

(iii) that nothing has occurred that would impair the ability of such control to protect the public health and environment;

(3) the owner will continue to allow access to such real property to evaluate the continued maintenance of such controls;

(4) nothing has occurred that would constitute a violation or failure to comply with any site management plan for such controls;

(5) the report and all attachments were prepared under the direction of, and reviewed by, the party making the certification;

(6) to the best of his/her knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program, and generally accepted engineering practices; and

(7) the information presented is accurate and complete.

3. Right to Enter and Inspect. Grantee, its agents, employees, or other representatives of the State may enter and inspect the Controlled Property in a reasonable manner and at reasonable times to assure compliance with the above-stated restrictions.

4. Reserved Grantor's Rights. Grantor reserves for itself, its assigns, representatives, and successors in interest with respect to the Property, all rights as fee owner of the Property, including:

A. Use of the Controlled Property for all purposes not inconsistent with, or limited by the terms of this Environmental Easement;

B. The right to give, sell, assign, or otherwise transfer part or all of the underlying fee interest to the Controlled Property, subject and subordinate to this Environmental Easement;

5. Enforcement

A. This Environmental Easement is enforceable in law or equity in perpetuity by Grantor, Grantee, or any affected local government, as defined in ECL Section 71-3603, against

the owner of the Property, any lessees, and any person using the land. Enforcement shall not be defeated because of any subsequent adverse possession, laches, estoppel, or waiver. It is not a defense in any action to enforce this Environmental Easement that: it is not appurtenant to an interest in real property; it is not of a character that has been recognized traditionally at common law; it imposes a negative burden; it imposes affirmative obligations upon the owner of any interest in the burdened property; the benefit does not touch or concern real property; there is no privity of estate or of contract; or it imposes an unreasonable restraint on alienation.

B. If any person violates this Environmental Easement, the Grantee may revoke the Certificate of Completion with respect to the Controlled Property.

C. Grantee shall notify Grantor of a breach or suspected breach of any of the terms of this Environmental Easement. Such notice shall set forth how Grantor can cure such breach or suspected breach and give Grantor a reasonable amount of time from the date of receipt of notice in which to cure. At the expiration of such period of time to cure, or any extensions granted by Grantee, the Grantee shall notify Grantor of any failure to adequately cure the breach or suspected breach, and Grantee may take any other appropriate action reasonably necessary to remedy any breach of this Environmental Easement, including the commencement of any proceedings in accordance with applicable law.

D. The failure of Grantee to enforce any of the terms contained herein shall not be deemed a waiver of any such term nor bar any enforcement rights.

6. Notice. Whenever notice to the Grantee (other than the annual certification) or approval from the Grantee is required, the Party providing such notice or seeking such approval shall identify the Controlled Property by referencing the following information:

County, NYSDEC Site Number, NYSDEC Brownfield Cleanup Agreement, State Assistance Contract or Order Number, and the County tax map number or the Liber and Page or computerized system identification number.

Parties shall address correspondence to:      Site Number: C224305  
Office of General Counsel  
NYSDEC  
625 Broadway  
Albany New York 12233-5500

With a copy to:      Site Control Section  
Division of Environmental Remediation  
NYSDEC  
625 Broadway  
Albany, NY 12233

All notices and correspondence shall be delivered by hand, by registered mail or by Certified mail and return receipt requested. The Parties may provide for other means of receiving and communicating notices and responses to requests for approval.

7. Recordation. Grantor shall record this instrument, within thirty (30) days of execution of this instrument by the Commissioner or her/his authorized representative in the office of the

recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

8. Amendment. Any amendment to this Environmental Easement may only be executed by the Commissioner of the New York State Department of Environmental Conservation or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

9. Extinguishment. This Environmental Easement may be extinguished only by a release by the Commissioner of the New York State Department of Environmental Conservation, or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

10. Joint Obligation. If there are two or more parties identified as Grantor herein, the obligations imposed by this instrument upon them shall be joint and several.

11. Consistency with the SMP. To the extent there is any conflict or inconsistency between the terms of this Environmental Easement and the SMP, regarding matters specifically addressed by the SMP, the terms of the SMP will control.

**Remainder of Page Intentionally Left Blank**





**THIS ENVIRONMENTAL EASEMENT IS HEREBY ACCEPTED BY THE PEOPLE OF THE STATE OF NEW YORK**, Acting By and Through the Department of Environmental Conservation as Designee of the Commissioner,

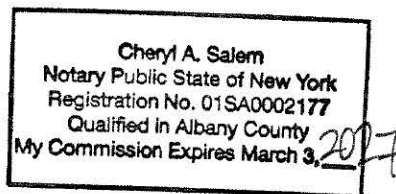
By: Andrew O. Guglielmi  
Andrew O. Guglielmi/Director  
Division of Environmental Remediation

**Grantee's Acknowledgment**

STATE OF NEW YORK     )  
  ) ss:  
COUNTY OF ALBANY     )

On the 10<sup>th</sup> day of November in the year 2023 before me, the undersigned, personally appeared Andrew O. Guglielmi, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/ executed the same in his/her/ capacity as Designee of the Commissioner of the State of New York Department of Environmental Conservation, and that by his/her/ signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

Cheryl A. Salem  
Notary Public - State of New York





**SCHEDULE "A" PROPERTY DESCRIPTION**

**Borough of Brooklyn, Block: 2020, Lot: 68 (Former Lots 68, 70, 73, 74 & 77)**

**Environmental Easement Area:**

ALL that certain plot, piece or parcel of land, situate, lying and being in the Borough of Brooklyn, County of Kings, City and State of New York, bounded and described as follows:

BEGINNING at a point on the northerly side of Atlantic Avenue, distant 182 feet 10 inches westerly from the corner formed by the intersection of the northerly side of Atlantic Avenue with the westerly side of Franklin Avenue;

RUNNING THENCE northerly at right angles to Atlantic Avenue, 84 feet 2 inches;

THENCE northwesterly forming an interior angle of 156 degrees 00 minutes 22 seconds with the preceding course, a distance of 41 feet 2 inches;

THENCE southwesterly forming an interior angle of 94 degrees 18 minutes 25 seconds with the preceding course, a distance of 11 feet 2-5/8 inches;

THENCE westerly forming an exterior angle of 160 degrees 18 minutes 47 seconds with the preceding course, and parallel with Atlantic Avenue, a distance of 170 feet 7-3/4 inches;

THENCE northerly at right angles with the preceding course, a distance of 20 feet 0 inches;

THENCE westerly parallel with Atlantic Avenue, a distance of 180 feet 0 inches;

THENCE southerly at right angles with the preceding course, a distance of 19 feet 0 inches;

THENCE easterly parallel with Atlantic Avenue, a distance of 7 feet 3 inches;

THENCE southerly at right angles to Atlantic Avenue, a distance of 199 feet 0 inches to the northerly side of Atlantic Avenue;

THENCE easterly along the northerly side of Atlantic Avenue, a distance of 370 feet 8-1/2 inches, to the point or place of BEGINNING.

Area: 47,103.8 Square Feet, 1.0814 Acres

METES AND BOUNDS DESCRIPTION

BOROUGH OF BROOKLYN

BLOCK 2020 – PARTS OF LOT 68

ALL THOSE CERTAIN PLOTS, PIECES OR PARCELS OF LAND, SITUATE, LYING AND BEING IN THE BOROUGH OF BROOKLYN, COUNTY OF KINGS, CITY OF NEW YORK, KNOWN AS PARTS OF TAX LOT 68 IN BLOCK 2020 SHOWN ON THE TAX MAPS FOR THE BOROUGH OF BROOKLYN, BOUNDED AND DESCRIBED AS FOLLOWS:

TRACK 2:

BEGINNING AT A POINT ON THE NORTHERLY SIDE OF ATLANTIC AVENUE WHICH POINT IS DISTANT 225.71 FEET WESTERLY FROM THE CORNER FORMED BY THE INTERSECTION OF THE WESTERLY SIDE OF FRANKLIN AVENUE WITH THE NORTHERLY SIDE OF ATLANTIC AVENUE;

RUNNING THENCE NORTHERLY AT A RIGHT ANGLE WITH THE NORTH SIDE OF ATLANTIC AVENUE, 118.00 FEET TO A POINT;

RUNNING THENCE WESTERLY, PARALLEL WITH ATLANTIC AVENUE, 155.08 FEET TO A POINT;

RUNNING THENCE NORTHERLY AT A RIGHT ANGLE WITH THE PREVIOUS COURSE, 20.00 FEET TO A POINT;

RUNNING THENCE WESTERLY, PARALLEL WITH ATLANTIC AVENUE, 150.41 FEET TO A POINT;

RUNNING THENCE SOUTHERLY AT A RIGHT ANGLE WITH THE PREVIOUS COURSE AND PERPENDICULAR TO SAID NORTHERLY SIDE OF ATLANTIC AVENUE, 138.00 FEET TO A POINT;

RUNNING THENCE EASTERLY ALONG SAID NORTHERLY SIDE OF ATLANTIC AVENUE, 305.49 FEET TO THE POINT OR PLACE OF BEGINNING.

TRACK 4A:

BEGINNING AT A POINT ON THE NORTHERLY SIDE OF ATLANTIC AVENUE WHICH POINT IS DISTANT 182.84 FEET WESTERLY FROM THE CORNER FORMED BY THE INTERSECTION OF THE WESTERLY SIDE OF FRANKLIN AVENUE WITH THE NORTHERLY SIDE OF ATLANTIC AVENUE;

RUNNING THENCE NORTHERLY AT A RIGHT ANGLE WITH THE NORTH SIDE OF ATLANTIC AVENUE, 84.17 FEET TO A POINT;

RUNNING THENCE NORTHWESTERLY AT AN ANGLE OF 155 DEGREES 59 MINUTES 45 SECONDS WITH THE PREVIOUS COURSE DEFLECTING TO THE RIGHT, 41.17 FEET TO A POINT;

RUNNING THENCE WESTERLY AT AN ANGLE OF 94 DEGREES 19 MINUTES 02 SECONDS WITH THE PREVIOUS COURSE DEFLECTING TO THE RIGHT, 11.22 FEET TO A POINT;

RUNNING THENCE WESTERLY AT AN ANGLE OF  $160^{\circ}18'47''$  WITH THE PREVIOUS COURSE DEFLECTING TO THE LEFT, AND PARALLEL WITH ATLANTIC AVENUE, 15.56 FEET TO A POINT;

RUNNING THENCE SOUTHERLY AT A RIGHT ANGLE WITH THE PREVIOUS COURSE AND PERPENDICULAR TO SAID NORTHERLY SIDE OF ATLANTIC AVENUE, 118.00 FEET TO A POINT;

RUNNING THENCE EASTERLY ALONG SAID NORTHERLY SIDE OF ATLANTIC AVENUE, 42.87 FEET TO THE POINT OR PLACE OF BEGINNING.

TRACK 4B:

BEGINNING AT A POINT ON THE SOUTHEASTERLY SIDE OF ATLANTIC AVENUE WHICH POINT IS DISTANT 531.20 FEET WESTERLY FROM THE CORNER FORMED BY THE INTERSECTION OF THE WESTERLY SIDE OF FRANKLIN AVENUE WITH THE NORTHERLY SIDE OF ATLANTIC AVENUE;

RUNNING THENCE NORTHERLY AT A RIGHT ANGLE WITH THE NORTH SIDE OF ATLANTIC AVENUE, 138.00 FEET TO A POINT;

RUNNING THENCE WESTERLY, PARALLEL WITH ATLANTIC AVENUE, 29.59 FEET TO A POINT;

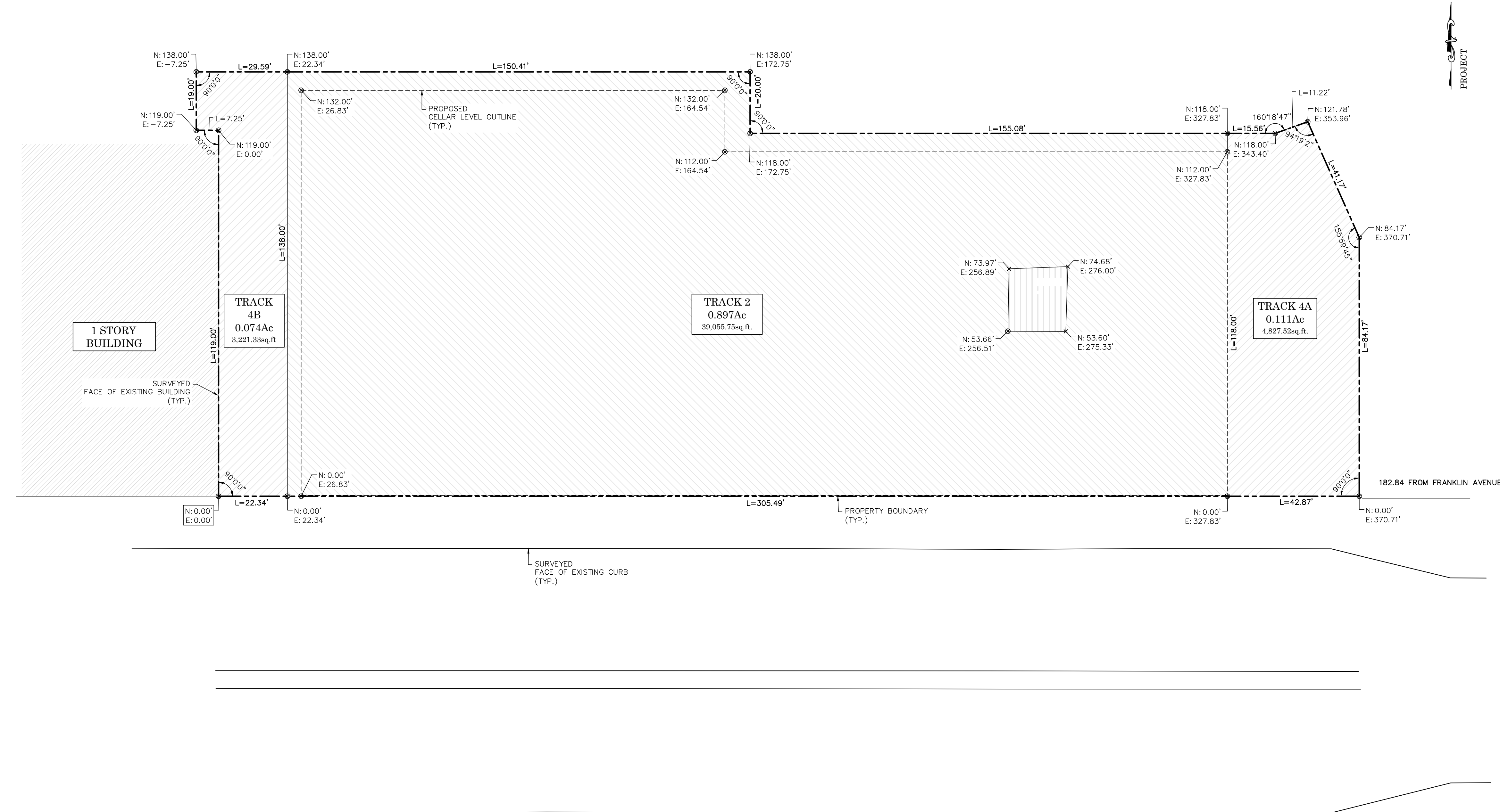
RUNNING THENCE SOUTHERLY AT A RIGHT ANGLE WITH THE PREVIOUS COURSE AND PERPENDICULAR TO SAID NORTHERLY SIDE OF ATLANTIC AVENUE, 19.00 FEET TO A POINT;

RUNNING THENCE EASTERLY, PARALLEL WITH ATLANTIC AVENUE, 7.25 FEET TO A POINT;

RUNNING THENCE SOUTHERLY AT A RIGHT ANGLE WITH THE PREVIOUS COURSE AND PERPENDICULAR TO SAID NORTHERLY SIDE OF ATLANTIC AVENUE, 119.00 FEET TO A POINT;

RUNNING THENCE EASTERLY ALONG SAID NORTHERLY SIDE OF ATLANTIC AVENUE, 22.34 FEET TO THE POINT OR PLACE OF BEGINNING.

\\VA-PROJECT\2022\NYC22-286-LEVINE-1041-1065 Atlantic Ave\SURVEY\008 - Final Drawings\NYC22-286-103-Rev2-Settled.dwg      Nov 07, 2023 - 11:22AM



**BOROUGH OF BROOKLYN, BLOCK 2020 – LOT 68**

ALL THAT CERTAIN PLOT, PIECE OR PARCEL OF LAND, SITUATE, LYING AND BEING IN THE BOROUGH OF BROOKLYN, COUNTY OF KINGS, CITY OF NEW YORK, KNOWN AS PART OF TAX LOT 68 IN BLOCK 2020 SHOWN ON THE TAX MAPS FOR THE BOROUGH OF BROOKLYN, BOUNDED AND DESCRIBED AS FOLLOWS:

**TRACK 2:**

BEGINNING AT A POINT ON THE NORTHERLY SIDE OF ATLANTIC AVENUE WHICH POINT IS DISTANT 225.71 FEET WESTERLY FROM THE CORNER FORMED BY THE INTERSECTION OF THE WESTERLY SIDE OF FRANKLIN AVENUE WITH THE NORTHERLY SIDE OF ATLANTIC AVENUE; RUNNING THENCE NORTHERLY AT A RIGHT ANGLE WITH THE NORTH SIDE OF ATLANTIC AVENUE, 118.00 FEET TO A POINT; RUNNING THENCE WESTERLY, PARALLEL WITH ATLANTIC AVENUE, 155.08 FEET TO A POINT; RUNNING THENCE NORTHERLY AT A RIGHT ANGLE WITH THE PREVIOUS COURSE, 20.00 FEET TO A POINT; RUNNING THENCE WESTERLY, PARALLEL WITH ATLANTIC AVENUE, 150.41 FEET TO A POINT; RUNNING THENCE SOUTHERLY AT A RIGHT ANGLE WITH THE PREVIOUS COURSE AND PERPENDICULAR TO SAID NORTHERLY SIDE OF ATLANTIC AVENUE, 138.00 FEET TO A POINT; RUNNING THENCE EASTERLY ALONG SAID NORTHERLY SIDE OF ATLANTIC AVENUE, 305.49 FEET TO THE POINT OR PLACE OF BEGINNING.

**TRACK 4A:**


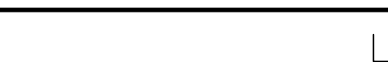
BEGINNING AT A POINT ON THE NORTHERLY SIDE OF ATLANTIC AVENUE WHICH POINT IS DISTANT 182.84 FEET WESTERLY FROM THE CORNER FORMED BY THE INTERSECTION OF THE WESTERLY SIDE OF FRANKLIN AVENUE WITH THE NORTHERLY SIDE OF ATLANTIC AVENUE; RUNNING THENCE NORTHERLY AT A RIGHT ANGLE WITH THE NORTH SIDE OF ATLANTIC AVENUE, 84.17 FEET TO A POINT; RUNNING THENCE NORTHWESTERLY AND AT AN ANGLE OF 155°59'45" WITH THE PREVIOUS COURSE DEFLECTING TO THE RIGHT, 41.17 FEET TO A POINT; RUNNING THENCE WESTERLY AT AN ANGLE OF 94°19'2" WITH THE PREVIOUS COURSE DEFLECTING TO THE RIGHT, 11.22 FEET TO A POINT; RUNNING THENCE SOUTHERLY AT AN ANGLE OF 160°18'47" WITH THE PREVIOUS COURSE DEFLECTING TO THE LEFT, AND PARALLEL WITH ATLANTIC AVENUE, 15.56 FEET TO A POINT; RUNNING THENCE SOUTHERLY AT A RIGHT ANGLE WITH THE PREVIOUS COURSE AND PERPENDICULAR TO SAID NORTHERLY SIDE OF ATLANTIC AVENUE, 118.00 FEET TO A POINT; RUNNING THENCE EASTERLY ALONG SAID NORTHERLY SIDE OF ATLANTIC AVENUE, 42.87 FEET TO THE POINT OR PLACE OF BEGINNING.

**TRACK 4B:**

BEGINNING AT A POINT ON THE NORTHERLY SIDE OF ATLANTIC AVENUE WHICH POINT IS DISTANT 531.20 FEET WESTERLY FROM THE CORNER FORMED BY THE INTERSECTION OF THE WESTERLY SIDE OF FRANKLIN AVENUE WITH THE NORTHERLY SIDE OF ATLANTIC AVENUE; RUNNING THENCE NORTHERLY AT A RIGHT ANGLE WITH THE NORTH SIDE OF ATLANTIC AVENUE, 138.00 FEET TO A POINT; RUNNING THENCE WESTERLY, PARALLEL WITH ATLANTIC AVENUE, 29.59 FEET TO A POINT; RUNNING THENCE SOUTHERLY AT A RIGHT ANGLE WITH THE PREVIOUS COURSE AND PERPENDICULAR TO SAID NORTHERLY SIDE OF ATLANTIC AVENUE, 19.00 FEET TO A POINT; RUNNING THENCE EASTERLY, PARALLEL WITH ATLANTIC AVENUE, 7.25 FEET TO A POINT; RUNNING THENCE SOUTHERLY AT A RIGHT ANGLE WITH THE PREVIOUS COURSE AND PERPENDICULAR TO SAID NORTHERLY SIDE OF ATLANTIC AVENUE, 119.00 FEET TO A POINT; RUNNING THENCE EASTERLY ALONG SAID NORTHERLY SIDE OF ATLANTIC AVENUE, 22.34 FEET TO THE POINT OR PLACE OF BEGINNING.

- LEGEND:**
- SURVEYED SPOT ELEVATION
  - TRACK 2 / 15FT REMEDIAL EXCAVATION
  - TRACK 4 / 2FT REMEDIAL EXCAVATION
  - TRACK 2 / 17FT REMEDIAL EXCAVATION

- NOTES:**
- ALL LOCATIONS ARE REFERENCED TO AN ASSUMED HORIZONTAL COORDINATE SYSTEM WITH ORIGIN 0,0 SET AT SOUTHWEST PROPERTY CORNER.
  - ALL ELEVATIONS ARE REFERENCED TO NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
  - FIELD SURVEY PERFORMED ON 06/06/2023 AND 07/11/2023, BY GARDEN STATE SURVEYING, ENGINEERING AND PLANNING OF NEW YORK, INC.
  - PROPERTY BOUNDARY INFORMATION OBTAINED FROM DRAWING ASC23007-2 "TITLE SURVEY", PREPARED BY AREK SURVEYING P.C., LAST REVISED 02/28/2023 AND DRAWING "SITE LOCATION PLAN", SHEET NO. A-101.00, PREPARED BY DENCITYWORKS ARCHITECT, LAST REVISED 03-01-2023, PROVIDED BY THE CLIENT.
  - CELLAR LEVEL OUTLINE COORDINATES TAKEN FROM DRAWING A-200.00 "CELLAR FLOOR PLAN", LAST REVISED 06/12/2023, PROVIDED BY THE CLIENT.
  - BACKGROUND TAKEN FROM DRAWING "Remedial Excavation Depths", ISSUED 9/27/2023, PROVIDED BY THE CLIENT.

						SCALE: 1"=20'			<b>Garden State</b> SURVEYING ENGINEERING & PLANNING OF NEW YORK, INC.  Tel.: (212) 840-6331	<b>VINCENT E. ZAKRZEWSKI</b>  LICENSED LAND SURVEYOR NY LICENSE NO. 050351		IT IS A VIOLATION OF SECTION 7209.2 OF THE NEW YORK STATE EDUCATION LAW FOR ANY PERSON, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER OR LAND SURVEYOR, TO ALTER AN ITEM IN ANY WAY. IF AN ITEM BEARING THE SEAL OF AN ENGINEER OR LAND SURVEYOR IS ALTERED, THE ALTERING ENGINEER OR LAND SURVEYOR SHALL AFFIX TO THE ITEM HIS OR HER SEAL AND THE NOTATION "ALTERED BY" FOLLOWED BY HIS OR HER SIGNATURE AND THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION.	DRAWN: IM	LEVINE	SITE SURVEYING WITH CLEAN UP TRACK AREAS	REV. 11/07/23
						ORIGINAL DRAWING PRINT SIZE IS 24"x36"							DESIGNED: N/A	1041-1065 ATLANTIC AVENUE BROOKLYN, NEW YORK		
													CHECKED: VZ	PROJECT NO.: NYC22-286		
													APPROVED: -	CLASSIFICATION: SURVEY		
													DRAWING No.: 103			
2	11/07/23	IM	VZ	EDIT TO M & B		GARDEN STATE ENGINEERING, SURVEYING & PLANNING, INC. ALL RIGHTS RESERVED. THE COPYING OR REUSE OF THIS DOCUMENT, OR PORTIONS THEREOF, FOR OTHER THAN THE ORIGINAL PROJECT OR THE PURPOSE ORIGINALLY INTENDED, WITHOUT THE WRITTEN PERMISSION OF GARDEN STATE ENGINEERING, SURVEYING & PLANNING, INC., IS PROHIBITED.										
1	11/03/23	IM	VZ	ACREAGE ADDED												
0	10/13/23	IM	VZ	ISSUED FOR RECORDS												
REV.	DATE	BY	CHKD	DESCRIPTION												

**Legal Description**  
**Atlantic Brooklyn Project – C224305**

**BOROUGH OF BROOKLYN, BLOCK: 2020, LOT: 68 (FORMER LOTS 68, 70, 73, 74 & 77)**

**Environmental Easement Area:**

ALL that certain plot, piece or parcel of land, situate, lying and being in the Borough of Brooklyn, County of Kings, City and State of New York, bounded and described as follows:

BEGINNING at a point on the northerly side of Atlantic Avenue, distant 182 feet 10 inches westerly from the corner formed by the intersection of the northerly side of Atlantic Avenue with the westerly side of Franklin Avenue;

RUNNING THENCE northerly at right angles to Atlantic Avenue, 84 feet 2 inches;

THENCE northwesterly forming an interior angle of 156 degrees 00 minutes 22 seconds with the preceding course, a distance of 41 feet 2 inches;

THENCE southwesterly forming an interior angle of 94 degrees 18 minutes 25 seconds with the preceding course, a distance of 11 feet 2-5/8 inches;

THENCE westerly forming an exterior angle of 160 degrees 18 minutes 47 seconds with the preceding course, and parallel with Atlantic Avenue, a distance of 170 feet 7-3/4 inches;

THENCE northerly at right angles with the preceding course, a distance of 20 feet 0 inches;

THENCE westerly parallel with Atlantic Avenue, a distance of 180 feet 0 inches;

THENCE southerly at right angles with the preceding course, a distance of 19 feet 0 inches;

THENCE easterly parallel with Atlantic Avenue, a distance of 7 feet 3 inches;

THENCE southerly at right angles to Atlantic Avenue, a distance of 199 feet 0 inches to the northerly side of Atlantic Avenue;

THENCE easterly along the northerly side of Atlantic Avenue, a distance of 370 feet 8-1/2 inches, to the point or place of BEGINNING.

Area: 47,103.8 Square Feet, 1.0814 Acres

Deed:

ALL that certain plot, piece or parcel of land, situate, lying and being in the Borough of Brooklyn, County of Kings, City and State of New York, bounded and described as follows:

*Parcel A (Former Lot 77):*

BEGINNING at a point on the northerly side of Atlantic Avenue which point is distant 373.16 feet westerly from the corner formed by the intersection of the westerly side of Franklin Avenue with the northerly side of Atlantic Avenue;

RUNNING THENCE northerly at right angles with the north side of Atlantic Avenue, 80 feet;

RUNNING THENCE easterly at right angles with the last mentioned line, 40 feet 6 inches;

RUNNING THENCE southeasterly and forming an exterior angle of 109 degrees 48 minutes 00 seconds with the last mentioned line, 5 feet 6 inches;

RUNNING THENCE northeasterly at right angles with the last mentioned line, 127 feet 5-1/2 inches;

RUNNING THENCE westerly on a line forming an interior angle of 19 degrees 48 minutes 00 seconds with the last mentioned line, 170 feet 4 inches;

RUNNING THENCE northerly at right angles with the north line of Atlantic Avenue, 20 feet;

RUNNING THENCE westerly parallel with the north side of Atlantic Avenue, 180 feet;

RUNNING THENCE southerly at right angles with the last mentioned line, 20 feet;

RUNNING THENCE easterly at right angles with the last mentioned line, 7 feet 8 inches;

RUNNING THENCE southerly at right angles with the last mentioned line, 118 feet to the northerly line of Atlantic Avenue;

RUNNING THENCE along the northerly side of Atlantic Avenue, 180 feet 4-1/2 inches to the point or place of BEGINNING.

Area: 29,087.1 Sq.Ft. 0.6677 Acres

*Parcel B (Former Lot 70):*

BEGINNING at a point on the northerly side of Atlantic Avenue, distant 222 feet 10 inches west of the corner formed by the intersection of the northerly side of Atlantic Avenue and the westerly side of Franklin Avenue;

RUNNING THENCE northerly at right angles to Atlantic Avenue, 77 feet 8 inches;

THENCE again northerly and parallel with Franklin Avenue, 34 feet 0-1/2 inches to the northerly side of the old Brooklyn and Jamaica Turnpike;

THENCE westerly, 82 feet 10 inches;

THENCE southerly along the line forming an interior angle with the preceding course, 85 degrees 42 minutes 00 second, 39 feet 10-3/4 inches to an angle point;

THENCE again southerly along a line forming an interior angle with the preceding course, 180 degrees 22 minutes, 20 feet 10 inches to an angle point;

THENCE southerly along a line forming an interior angle with the preceding course of 194 degrees 39 minutes 43 seconds, 25 feet 3-3/8 inches to the northerly side of Atlantic Avenue;

THENCE easterly along the northerly side of Atlantic Avenue, 63 feet 8-1/2 inches to the point or place of BEGINNING.

Area: 7,353.3 Sq.Ft. 0.1688 Acres

*Parcel C (Former Lot 74):*

BEGINNING at a point on the northerly side of Atlantic Avenue, distant 309 feet 2 inches westerly from the corner formed by the intersection of the northerly side of Atlantic Avenue with the westerly side of Franklin Avenue;

RUNNING THENCE northerly at an interior angle, 77 degrees 57 minutes 02 seconds, 36 feet 11-7/8 inches;

THENCE northerly at right angles to Old Atlantic Avenue or Clove Road (now closed), 46 feet 7 inches 46.58 (Tax Map);

THENCE westerly parallel with Atlantic Avenue as now laid out, 40 feet 6 inches;

THENCE southerly at right angles to Atlantic Avenue as now laid out, 80 feet to the northerly side of Atlantic Avenue;

THENCE easterly along the northerly side of Atlantic Avenue as now laid out, 64 feet to the point or place of BEGINNING.

Area: 4,296.2 Sq.Ft. 0.0986 Acres

*Parcel D (Former Lot 73):*

BEGINNING at a point on the northerly side of Atlantic Avenue, distant 286.54 feet westerly from the corner formed by the intersection of the northerly side of Atlantic Avenue with the westerly side of Franklin Avenue;

RUNNING THENCE northerly forming an exterior angle with the northerly side of Atlantic Avenue, 80 degrees 55 minutes 43 seconds, and along the westerly face of the westerly wall of

the 2 story brick building on the premises adjoining on the east, a distance of 25 feet 3-3/8 inches;

THENCE still northerly forming an exterior angle with the last preceding course of 194 degrees 39 minutes and along the westerly face of the westerly wall of the one and two story buildings on the premises adjoining to the east, a distance of 20 feet 10 inches;

THENCE still northerly along the westerly face of the westerly wall of said one story building on the premises adjoining on the east, 39 feet 10-3/4 inches;

THENCE westerly, 16 feet 7 inches;

THENCE southerly and parallel with Franklin Avenue, 41 feet 1 inch;

THENCE still southerly, 36 feet 11-7/8 inches to the northerly side of Atlantic Avenue;

THENCE easterly along the northerly side of Atlantic Avenue, 22 feet 7-1/2 inches to the point or place of BEGINNING.

Area: 1,651.7 Sq.Ft. 0.0379 Acres

*Parcel E (Former Lot 68):*

BEGINNING at a point on the northerly side of Atlantic Avenue, distant 182 feet 10 inches westerly from the corner formed by the intersection of the northerly side of Atlantic Avenue with the westerly side of Franklin Avenue;

RUNNING THENCE westerly along the northerly side of Atlantic Avenue, 40 feet;

THENCE northerly at right angles to Atlantic Avenue, 77 feet 8 inches;

THENCE still northerly parallel with Franklin Avenue, 34 feet 0-1/2 inches;

THENCE easterly, 39 feet 2-1/2 inches;

THENCE southerly parallel with Franklin Avenue, 41 feet 4-1/2 inches; and

THENCE southerly at right angles to Atlantic Avenue, 84 feet 3-3/4 inches to the northerly side of Atlantic Avenue, at the point or place of BEGINNING.

Area: 4,711.8 Sq.Ft. 0.0182 Acres



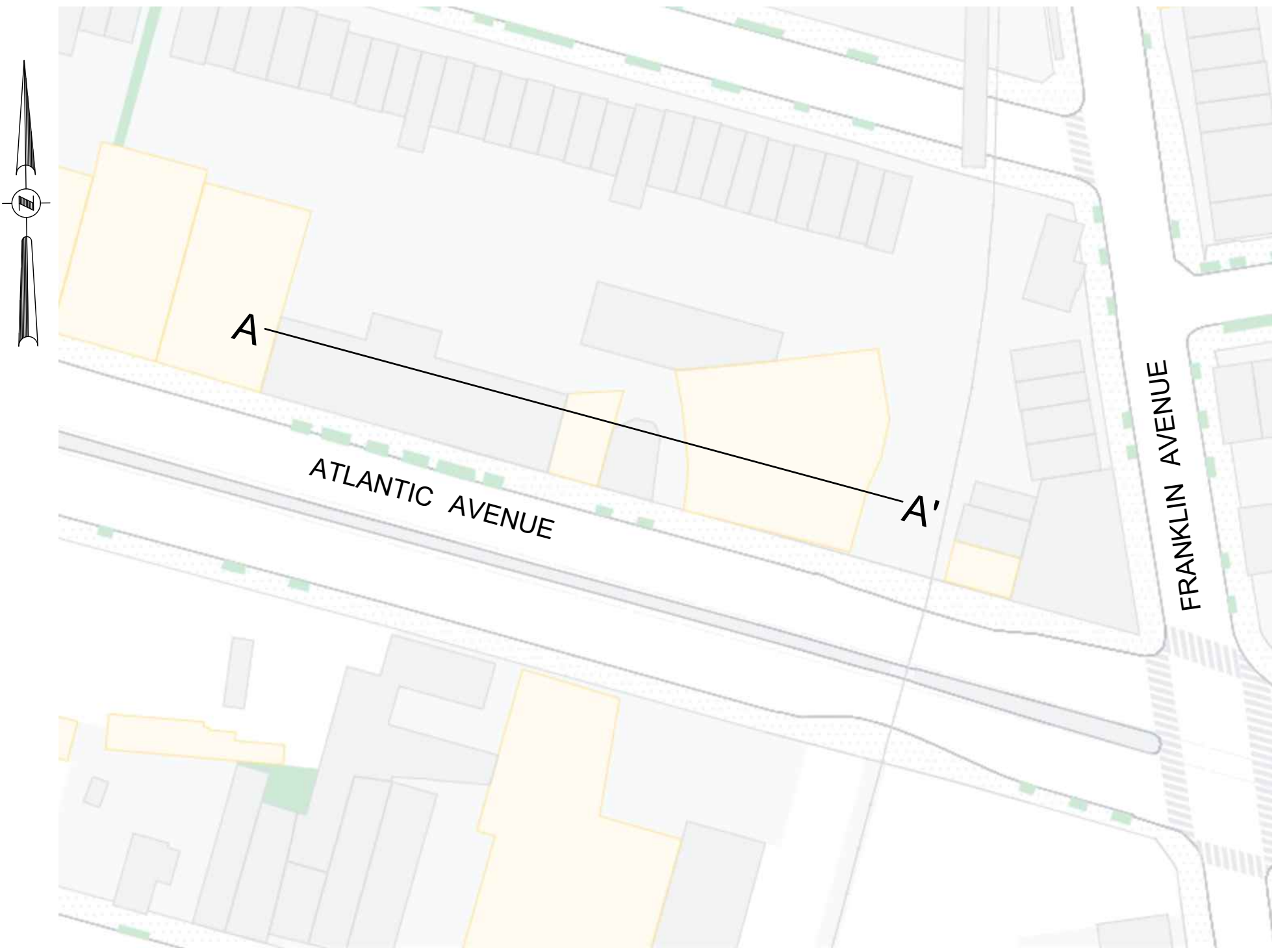
**APPENDIX B – LIST OF SITE CONTACTS**

<b>Name</b>	<b>Phone/Email Address</b>
1065 Atlantic Avenue LLC – Site Owner Contact: Graham Christensen	212-400-9297, gchristensen@ddny.com
1065 Atlantic Avenue LLC – Remedial Party Contact: Graham Christensen	212-400-9297, gchristensen@ddny.com
Jennifer Lewis, PG, Qualified Environmental Professional	631-589-6353, JenniferL@pwgrosser.com
Michael Scanlon, PE, Professional Engineer	631-589-6353, MScanlon@pwgrosser.com
Jennifer Gonzalez, NYSDEC Project Manager	718-482-4508, jennifer.gonzalez@dec.ny.gov
Andre Obligado, PG, NYSDEC DER Region 2 Section Chief	718-482-6725, andre.obligado@dec.ny.gov
Kelly Lewandowski, PE, NYSDEC Site Control Section Chief	Kelly.lewandowski@dec.ny.gov
James Sullivan, NYSDOH Project Manager	(518) 402-5584 Jim.Sullivan@health.ny.gov
David Yudelson, Sive, Paget & Riesel P.C., Environmental Attorney	917-295-6449, DYudelson@sprlaw.com

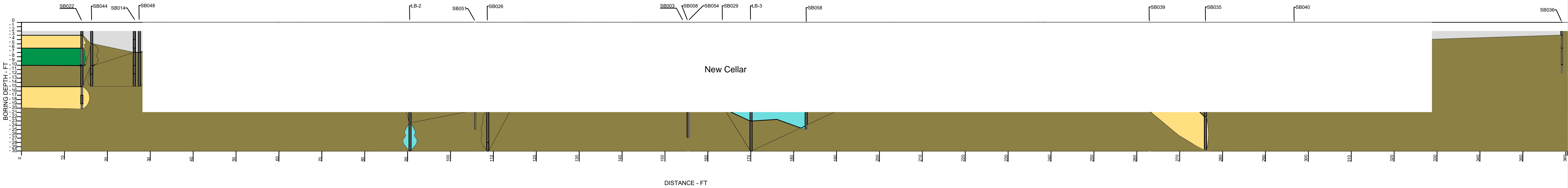
**APPENDIX C**

**GEOLOGIC CROSS SECTION**

CONSULTANTS



VICINITY MAP  
SCALE: 1" = 150'



CROSS SECTION A-A'



LEGENDS

- |   |  |
|---|--|
|  HISTORIC FILL                       |  MEDIUM SAND/SILTY SAND (SP - SM) |
|  CLAYEY SAND/ SILTY SAND & CLAY (SC) |  GRAVEL (GP)                      |
|  COARSE SAND (SW)                    |  |

7		
6		
5		
4		
3		
2		
1		

Drawn by	AM	Date Issued	11/21/2023
Checked by	AM	Project Number	AS NOTED
Reviewed by	JL	Scale	

CROSS SECTION VIEW

CROSS SECTION VIEW

## **APPENDIX D**

### **RESPONSIBILITIES of OWNER and REMEDIAL PARTY**

## **Responsibilities**

The responsibilities for implementing the Site Management Plan (“SMP”) for the Atlantic Brooklyn Project Site (the “Site”), number C224305, are divided between the Site owner(s) and a Remedial Party, as defined below. The owner(s) is/are currently listed as: 1065 Atlantic Avenue LLC (the “Owner”).

**Solely for the purposes of this document and based upon the facts related to a particular site and the remedial program being carried out,** the term Remedial Party (“RP”) refers to the following: certificate of completion holder, volunteer, applicant, responsible party, and, in the event the New York State Department of Environmental Conservation (“NYSDEC”) is carrying out remediation or Site management, the NYSDEC and/or an agent acting on its behalf. The RP is: 1065 Atlantic Avenue LLC.

Nothing on this page shall supersede the provisions of an Environmental Easement, Consent Order, Consent Decree, agreement, or other legally binding document that affects rights and obligations relating to the Site.

### **Site Owner’s Responsibilities:**

- 1) The Owner shall follow the provisions of the SMP as they relate to future construction and excavation at the Site.
- 2) In accordance with a periodic time frame determined by the NYSDEC, the owner shall periodically certify, in writing, that Institutional Controls set forth in an Environmental Easement remain in place and continue to be complied with. The Owner shall provide a written certification to the RP, upon the RP’s request, in order to allow the RP to include the certification in the Site’s Periodic Review Report (PRR) certification to the NYSDEC.
- 3) In the event the Site is delisted, the Owner remains bound by the Environmental Easement and shall submit, upon request by the NYSDEC, a written certification that the Environmental Easement is still in place and has been complied with.

- 4) The owner shall grant access to the Site to the RP and the NYSDEC and its agents for the purposes of performing activities required under the SMP and assuring compliance with the SMP.
- 5) The Owner is responsible for assuring the security of the remedial components located on its property to the best of its ability. If damage to the remedial components or vandalism is evident, the Owner shall notify the Site's RP and the NYSDEC in accordance with the timeframes indicated in the Notifications Section of this SMP.
- 6) If some action or inaction by the Owner adversely impacts the Site, the Owner must notify the Site's RP and the NYSDEC in accordance with the time frame indicated in the Notifications Section of this SMP and coordinate the performance of necessary corrective actions with the RP.
- 7) The Owner must notify the RP and the NYSDEC of a change in ownership of the Site property (identifying the tax map numbers in correspondence) and provide contact information for the new owner of the Site. 6 NYCRR Part 375-1.11(d). contains notification requirements applicable to a construction or activity changes and changes in ownership. Among the notification requirements is the following: Sixty days prior written notification must be made to the NYSDEC. Notification is to be submitted to the NYSDEC Division of Environmental Remediation's Site Control Section. Notification requirements for a change in use are detailed in Section 1.3 of the SMP. A change of use includes, but is not limited to, activity that may increase direct human or environmental exposure (e.g., day care, school or park). A 60-Day Advance Notification Form and Instructions are found at <http://www.dec.ny.gov/chemical/76250.html>.
- 8) Until such time as the NYSDEC deems the SVE system or SSDS unnecessary, the Owner shall operate the systems, pay for the utilities for the systems' operation, and report maintenance issues to the RP and the NYSDEC.
- 9) In accordance with the tenant notification law, within 15 days of receipt, the Owner must supply a copy of vapor intrusion data that is produced with respect to structures and that exceeds NYSDOH or OSHA guidelines on the Site, whether produced by the NYSDEC, RP, or Owner, to the tenants on the property. The Owner must otherwise comply with the tenant and occupant notification provisions of Environmental Conservation Law Article 27, Title 24.

### **Remedial Party Responsibilities**

- 1) The RP must follow the SMP provisions regarding construction and/or excavation it undertakes at the Site.

- 2) The RP shall report to the NYSDEC activities required for remediation, operation, maintenance, monitoring, and reporting. Such reporting includes, but is not limited to, periodic review reports and certifications, electronic data deliverables, corrective action work plans and reports, and updated SMPs.
- 3) Before accessing the Site property to undertake a specific activity, the RP shall provide the Owner advance notification that shall include an explanation of the work expected to be completed. The RP shall provide to (i) the Owner, upon the Owner's request, (ii) the NYSDEC, and (iii) other entities, if required by the SMP, a copy of data generated during the Site visit and/or a final report produced.
- 4) If the NYSDEC determines that an update of the SMP is necessary, the RP shall update the SMP and obtain final approval from the NYSDEC. Within 5 business days after NYSDEC approval, the RP shall submit a copy of the approved SMP to the Owner(s).
- 5) The RP shall notify the NYSDEC and the Owner of changes in RP ownership and/or control and of changes in the party/entity responsible for the operation, maintenance, and monitoring of and reporting with respect to remedial systems (Engineering Controls). The RP shall provide contact information for the new party/entity. Such activity constitutes a Change of Use pursuant to 375-1.11(d) and requires 60-days prior notice to the NYSDEC. A 60-Day Advance Notification Form and Instructions are found at <http://www.dec.ny.gov/chemical/76250.html>.
- 6) The RP shall notify the NYSDEC of damage to or modification of the systems as required under the Notifications Section of the SMP.
- 7) The RP is responsible for the proper maintenance of installed vapor intrusion mitigation systems associated with the Site, as required in the SMP.
- 8) Prior to a change in use that impacts the remedial systems or requirements and/or responsibilities for implementing the SMP, the RP shall submit to the NYSDEC for approval an amended SMP.
- 9) A change in use, change in ownership, change in Site classification (*e.g.*, delisting), reduction or expansion of remediation, and other significant changes related to the Site may result in a change in responsibilities and, therefore, necessitate an update to the SMP and/or updated legal documents. The RP shall contact the NYSDEC project manager to discuss the need to update such documents.

Change in RP ownership and/or control and/or Site ownership does not affect the RP's obligations with respect to the Site unless a legally binding document executed by the NYSDEC releases the RP of its obligations.

Future Site owners and RPs and their successors and assigns are required to carry out the activities set forth above.



**APPENDIX E**

**OPERATION, MAINTENCE, and MANAGEMENT PLAN with AS-BUILTS and  
EQUIPMENT SPECIFICATIONS**

ATLANTIC BROOKLYN PROJECT  
1045 TO 1065 ATLANTIC AVENUE  
BROOKLYN, NY 11238  
NYSDEC BCP ID: C224305

**SITE COVER, SSDS, AND SVE SYSTEM  
OPERATION, MAINTENANCE, AND MONITORING PLAN**

**PREPARED FOR:**

1065 Atlantic Brooklyn Avenue, LLC.  
7 Penn Plaza, Suite 600  
New York, New York 10001

**PREPARED BY:**



P.W. Grosser Consulting Engineer & Hydrogeologist, PC.  
630 Johnson Avenue, Suite 7  
Bohemia, New York 11716  
Phone: 631-589-6353

PWGC Project Number: TOT2201

NOVEMBER 2024

**OPERATION, MAINTENANCE, AND MONITORING PLAN**  
**1045-1065 ATLANTIC AVENUE**  
**BROOKLYN, NEW YORK 11238**

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#### **APPENDICES**

Appendix O-A	Site Cover Inspection Log
Appendix O-B	Manufacturer Specifications
Appendix O-C	OM&M Log for SSDS and SVE System

ACRONYM	DEFINITION
AMEC	AMEC E&E LP
AWQS	Ambient Water Quality Standard
DO	Dissolved Oxygen
O&M	Operation & Maintenance
OM&M	Operation, Maintenance, & Monitoring
ORP	Oxygen Reduction Potential
PE	Professional Engineer
SSDS	Sub-Slab Depressurization System
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound
W.C.	Water Column



## 1.0 INTRODUCTION

This Operation, Maintenance, and Monitoring (OM&M) Plan provides a description of the measures necessary to operate, monitor, and maintain the mitigation systems and remedial system at the Site. The three systems detailed in this plan include:

1. Composite Cover System
2. Sub-Slab Depressurization System (SSDS)
3. Soil Vapor Extraction (SVE) System



## 2.0 OM&M OF SITE COVER SYSTEM

This site cover system is comprised of an impermeable surface across the entire Site in the form of a building slab ranging from 6 inches to 4 feet in thickness and subgrade foundation walls measuring approximately 12 inches in thickness.

The system will be inspected annually, and its performance certified by a professional engineer (PE). The composite cover system does not require any special operation and maintenance (O&M) activities. If the system is breached during future construction activities, the system will be rebuilt by reconstructing the system according to the original design and tying newly constructed cover layers into existing cover layers to form a continuous layer.

If the composite cover system and underlying residual soil/material must be disturbed, the protocols outlined in the PWGC Site Management Plan that this OM&M Plan is attached to. A site cover inspection log is included as **Appendix O-A**.

### 3.0 OM&M OF SSDS

A SSDS has been installed beneath the new building's footprint to mitigate against potential soil vapor intrusion into the new building. The SSDS was installed in a trench format beneath the cellar and the portion of the first floor that is in contact with the soil and the riser was routed through the building to above the roofline to vent the vapor space beneath the building.

#### System Components

The SSDS piping consists of a Geovent system placed within a 4-inch thick layer of ½-inch to 1-inch crushed stone beneath the basement slab and first floor slabs that are in contact with the soil. A non-woven geotextile fabric has been placed beneath the stone layer to reduce fines from entering the system. The Geovent is connected to galvanized closed duct riser piping that will be routed through the building and to the roof as the building construction continues. The sub-cellar Geovent is connected to 6-inch diameter galvanized closed duct piping which increases to an 8-inch and then a 10-inch duct as it manifolds together. To transition from beneath the mat slab area and the slab-on-grade area, a section of solid 4-inch diameter Schedule 80 PVC is connected to a 90 degree elbow on each end which will connect to the sections of Geovent beneath the mat slab and the slab-on-grade. The sub-first-floor Geovent on the west side of the property is connected to 8-inch diameter galvanized closed duct piping and on the east side of the property it is connected to 6-inch diameter schedule 80 PVC beneath the ramp and then 8-inch diameter galvanized closed duct piping as it penetrates the cellar wall; this duct piping was routed through the top of the cellar and was manifolded to the riser piping from the sub-cellar SSDS piping continue up to above the roofline through 10-inch diameter closed duct piping. The SSDS riser piping is connected to a Cincinnati Fan model HP-8B18, 10.0 horse power, three-phase, 208 volt blower. The discharge point of the SSDS is located above the eave of the roof, a minimum of 10 feet from any opening that is less than 2 feet below the exhaust point, and a minimum of 10 feet from any adjoining or adjacent buildings or HVAC intakes or supply registers.

A SSDS liner membrane was installed under the foundation of the building to act as a reinforcement against vapor intrusion. If penetrated, this liner should be repaired in accordance with the manufacturer's specifications. The details of this SSDS liner system are included in the Site Management Plan that this OM&M Plan is attached to.

#### 3.2

Manufacturer specifications for the mechanical components of the systems are included in **Appendix A**.

#### SSDS Start-up Plan

Start-up and testing of the SSDS shall be conducted to ensure the system operates effectively for mitigation. System vacuum will be balanced for efficient removal of vapors below the building foundation and sufficient sub-slab vacuum. Review of system components post start-up will be conducted including, but not limited to;

- Inspection of piping, fittings, and equipment to ensure there are no leaks;

- Measuring of vacuum below the building's slab at designated vacuum monitoring points;
- Collection of ambient indoor air samples;
- Review of equipment to ensure it is operating according to manufacturer's specifications, and;
- System alarms are functional.

The SSDS start-up schedule is summarized in the table below.

SSDS Start-Up	
Occurrence	Task
Day 1 and 2.	SSDS start-up, inspect system, measure vacuum influence from vacuum monitoring points, adjust system configuration for optimal performance. Collect combined influent and combined effluent vapor sample after 24 hours of continuous operation.
Month 1	Inspect system, measure vacuum influence from vacuum monitoring points.
Month 2	Inspect system, measure vacuum influence from vacuum monitoring points.
Quarter 2 (Month 3)	Inspect system, measure vacuum influence from vacuum monitoring points.
Quarter 3	Inspect system, measure vacuum influence from vacuum monitoring points.
Quarter 4	Inspect system, measure vacuum influence from vacuum monitoring points.
Annual	Inspect system, collect combined effluent vapor sample.

If the system is not operating per design, troubleshooting will be performed, and deficient items will be corrected. A telemetry system will be installed to remotely monitor the system for vacuum to determine if the system is operating or not. If the low vacuum alarm is triggered, an inspection will be conducted in accordance with Section 3.4 of this OM&M plan.

3.3

#### **Routine System OM&M**

Following system start-up and the enhanced monitoring schedule for the first three months routine OM&M of the SSDS system should be performed on a quarterly basis for the first year of operation and then annually thereafter and will include assessing the system's current condition.

A visual inspection of the system will be conducted during each monitoring event. Unscheduled inspections and/or sampling may take place when a suspected failure of the SSDS has been reported or an emergency occurs that is deemed likely to affect the operation of the system. The inspection should include review of system components including piping, concrete slab integrity, the blower, low vacuum alarms, and vacuum monitoring points to ensure components are functioning effectively. If leaks are observed, they should be immediately repaired. Additionally, the location of the exhaust vent should be observed to ensure no air intakes have been located within a 10-foot radius.

The system's performance should be monitored to ensure a proper minimum vacuum is observed at monitoring points. Each vacuum monitoring point shall be tested for a minimum vacuum of 0.002 inches of water column (W.C.). If vacuum does not meet the minimum requirement, the



system should be adjusted to meet or exceed the condition. Vacuum readings should be recorded on the OM&M Logs (**Appendix O-C**) for each event. If readings are not within their specified operation range, equipment is observed to be malfunctioning, or the system is not performing within specifications, then maintenance and repair is required immediately.

#### **Non-Routine System OM&M**

In the event that non-routine maintenance is needed, the following information will be recorded and included in the subsequent status report:

- 3.4 • Name, company, and position of person(s) conducting non-routine maintenance/repair activities;
- Damage;
- Level and duration of reduced effectiveness;
- Other repairs or adjustments made to the system;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents; and
- Other documentation such as copies of invoices for repair work, receipts for replacement equipment, etc.

#### 4.0 OM&M OF SVE SYSTEM

A SVE system consisting of eight extraction wells has been installed beneath the cellar of the new building. Two of the SVE wells are located in the suspected source area of the contamination beneath the mat slab and the other six wells are located north of this area, spaced approximately 20 feet on center from each other, to prevent off-site migration north of the subject property.

Manufacturer specifications for the mechanical components of the systems are included in **Appendix O-B**.

##### System Components

A SVE system has been installed beneath the cellar and is focused in the area of elevated chlorinated solvent impacts observed in the soil vapor. Two of the SVE wells are located in the suspected source area of the contamination beneath the mat slab and the other six wells are located north of this area, spaced approximately 20 feet on center from each other, to prevent off-site migration north of the subject property.

The system has been designed to overcome the adsorption of the volatile contaminants of concern mainly through applying a vacuum of at least 0.1-inch of water column (w.c.) to the impacted soils. A total system vacuum ranging from 15 to 33-inches of w.c. at a design flow rate of 350 to 700 CFM was utilized for the basis of design in fan selection. This estimates that each well will operate at approximately 50 to 100 CFM and 2 to 5-inches of w.c. while considering head losses through wells and ducting system. While these are the anticipated operational parameters, the fan has been selected to provide up to 26-inches of w.c. and a flow rate of up to 1,250 CFM. The fan is provided with variable speed control to make operation as energy efficient as possible based on the initial balancing of the system. Based on these system operating parameters and the soil characteristics (medium sands), a radius of influence of approximately 25 feet was determined. Verification of system effectiveness is determined through effluent sampling analysis during system operation.

Each SVE well point was installed at a bottom elevation of 24 feet (approximately 56 feet below sidewalk grade). The SVE wells were constructed of 4-inch diameter schedule 40 PVC with 35 feet of 20-slot screen and riser to just below the top of slab (approximately 17 feet below sidewalk grade). Each of the six northern SVE well heads were finished with a j-plug and a flush mounted manhole cover at the slab to allow access to these wells for future testing during system operation. The well annuli were backfilled with #00 gravel to the top of the well screen and then a bentonite seal to the bottom of the sub-slab gravel layer. The six north SVE wells were interconnected to each other with 4-inch diameter schedule 80 solid PVC and the two middle SVE wells are interconnected to each other with 6-inch diameter schedule 80 solid PVC.

The SVE wells are manifolded together and connected to 8-inch diameter galvanized closed duct which is routed up to above the building's roof. The SVE system ducting is connected to a Ametek fan model Nautilair – NP140-3N02C-002. Four 55-gallon drums of granular activated carbon to filter the SVE effluent are plumbed parallel in a lead-lag configuration. The drums are configured in two legs with a lead drum and a lag drum on each leg. The permanent discharge point is set above the eave of the roof and is located more than 10 feet from any opening that is less than 2 feet below the exhaust point and more than 10 feet from any adjoining or adjacent buildings or HVAC intakes or supply registers.

The location of the SVE system's discharge point is shown on the as-built drawings included in **Appendix E**. The manufacturer specifications for the SVE system's blower are included as **Appendix E**.

The SVE system is connected to a remote telemetry system which measures vacuum, temperature, and humidity. An alarm is triggered if a low vacuum or a high vacuum condition is encountered.

Sampling ports are located on each riser section of the SVE system's legs (SVE Well #01 through #06 is one leg, SVE Well #07 and #08 is the other leg) prior to their union and on the roof there is a combined influent sampling port, mid-point carbon sampling ports, and a combined effluent sampling port.

To demonstrate sufficient ROI of the SVE system, three SVE wells (SVE Well #02, SVE Well #04, and SVE Well #06) from the northern cluster were temporarily utilized as SVE vacuum monitoring points in December 2023 while the system was activated temporarily to confirm system operation. This temporary SVE system, with an Ametek Nautilair NP140 6.6 horsepower fan, was not put into full operation. This test was repeated with the installation of the permanent system on the roof and the Ametek blower by the following process (conducted separately for each of the three selected wells):

- Tubing was installed through a sanitary grommet and the penetration was sealed.
- The selected SVE well was isolated by lowering the sanitary grommet in-place at the top of the well, below the manifold piping, utilizing an extension rod. This prevented the well from receiving vacuum from the manifold piping.
- The extension rod was secured in place.
- A manometer was connected to the tubing at the top of the well head to measure the vacuum in the SVE well during SVE system operation.
- Manometer readings confirmed that the isolated well received sufficient vacuum from the neighboring well(s); therefore, demonstrating the northern SVE well locations met the minimum expected radius of influence.

System start-up of the permanent SVE began on October 8, 2024. Results of the testing on the permanent SVE system, conducted on October 8, 2024, indicate that the radius of influence of each of the SVE wells is extending beyond the neighboring SVE wells, so there is no gap in coverage. The following vacuum readings were collected for each of the three wells:

- SVE Well #02 – 0.28 inches of water column.
- SVE Well #04 – 0.47 inches of water column.
- SVE Well #06 – 0.47 inches of water column.

#### **SVE System Start-Up and Testing Plan**

Start-up and testing of the SVE System shall be conducted to ensure the system operates as intended. Review of system components pre and/or post start-up will be conducted including, but not limited to:

- Inspect System:
  - Inspection of piping, fittings, and equipment to ensure there are no leaks;
  - Review of equipment to ensure it is operating according to manufacturer's specifications; and
  - System alarms are functional
- Measure Vacuum Influence:
  - Measuring vacuum influence by closing valves on individual extraction wells to gauge influence from nearby wells.
- Optimize System Performance:
  - After the system is started, the flow rate of the blower will be adjusted to operate the system as designed.
- Sample Collection:
  - Collection of air samples to evaluate the performance of the system and the carbon drums.

<b>SVE System Monitoring and Sampling Schedule</b>	
<b>Occurrence</b>	<b>Task</b>
Day 1	SVE start-up, inspect system, adjust system configuration for optimal performance.
Week 2	Inspect system, collect combined influent (pre-carbon), mid-point (id carbon), and effluent (post-carbon) vapor samples.
Month 3	Inspect system, collect combined influent (pre-carbon), mid-point (id carbon), and effluent (post-carbon) vapor samples.
Week 4	Inspect system, collect combined influent (pre-carbon), mid-point (id carbon), and effluent (post-carbon) vapor samples.
Quarters 2, 3, and 4	Inspect system, collect combined influent (pre-carbon), mid-point (id carbon), and effluent (post-carbon) vapor samples.
Annually (After first reporting period)	Inspect system, collect combined influent (pre-carbon), mid-point (id carbon), and effluent (post-carbon) vapor samples. Continue

SVE System Monitoring and Sampling Schedule	
Occurrence	Task
	operating and monitoring the system as per Section 4.3, provided systems are operating within normal parameters.

If the system is not operating per design, troubleshooting will be performed, and deficient items will be corrected. A telemetry system is installed to remotely monitor the system for vacuum to determine if the system is operating or not. If the vacuum is deemed too low, an inspection will be conducted in accordance with Section 4.4 of this OM&M manual.

#### Routine System OM&M and Alarms

Because of the numerous mechanical components of the SVE system (i.e. blower, valves, etc.), regular maintenance activities are recommended to ensure the system operates efficiently. Specific equipment maintenance activities will include annual inspections to conduct the following:

- System monitoring, including recording system operational parameters.
- Visual inspections of the SVE components for leaks, damage, or scale / sediment build-up.
- Critical device / alarm testing and inspection.
- Collection of a combined effluent vapor sample.

System inspection logs are included in **Appendix O-C**.

In addition, an alarm system functions via the remote telemetry system. The remote telemetry monitors the vacuum on the system and when it goes below or above to set vacuum monitoring points, an email alert is sent to the consulting team.

#### Non-Routine OM&M

Non-routine equipment maintenance associated with the SVE system includes the following:

- Name, company, and position of person(s) conducting non-routine maintenance/repair activities;
- Inspection for damage and/or malfunctions;
- Level and duration of reduced effectiveness;
- Other repairs or adjustments made to the system;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents; and
- Other documentation such as copies of invoices for repair work, receipts for replacement equipment, etc;
- Replace the blower or other parts on an as needed basis due to damage or exceeding the life expectancy of the equipment;

- If monitoring indicates that the system is not functioning as the design intended, the system may have to be redesigned, modified, and restarted. The NYSDEC will be consulted prior to any modifications to the SVE system.



## 5.0 SYSTEM TERMINATION

The SVE system and the SSDS shall remain operational until such time that the NYSDEC and NYSDOH approve their decommissioning. The procedures for decommissioning will be negotiated at such time.





## APPENDIX O-A SITE COVER INSPECTION LOG





# **Annual Inspection Checklist – Site Cover System**

ATLANTIC BROOKLYN PROJECT

1057 Atlantic Avenue

Brooklyn, New York

NYSDEC BCP #224305

Date/time: \_\_\_\_\_

Inspector (name/organization):

Detail the condition of the Site Cover System including the first-floor concrete slab and basement foundation walls. Make note of any significant penetrations through the concrete slab:

Are any repairs and/or maintenance needed at this time? If so, conduct another inspection following repairs.

Name	Signature	Date
------	-----------	------



## APPENDIX O-B MANUFACTURER'S SPECIFICATION



**NAUTILAIR**
**Model: NP140-4N06C-0000**
**MECHANICAL**

**DIAMETER:** 14" (312mm)  
**DISCHARGE TYPE:** Tangential  
**DISCHARGE:** Standard Rectangular Flange  
**APPROXIMATE WEIGHT:** 28lbs/12.7kg

**PERFORMANCE**

**FLOW CLASSIFICATION:** High Energy  
**STAGES:** 1 Stage

**TEMPERATURE**

**OPERATING TEMP:** 0°C to 50°C  
**STORAGE TEMP:** -40°C to 85°C

**ELECTRICAL**

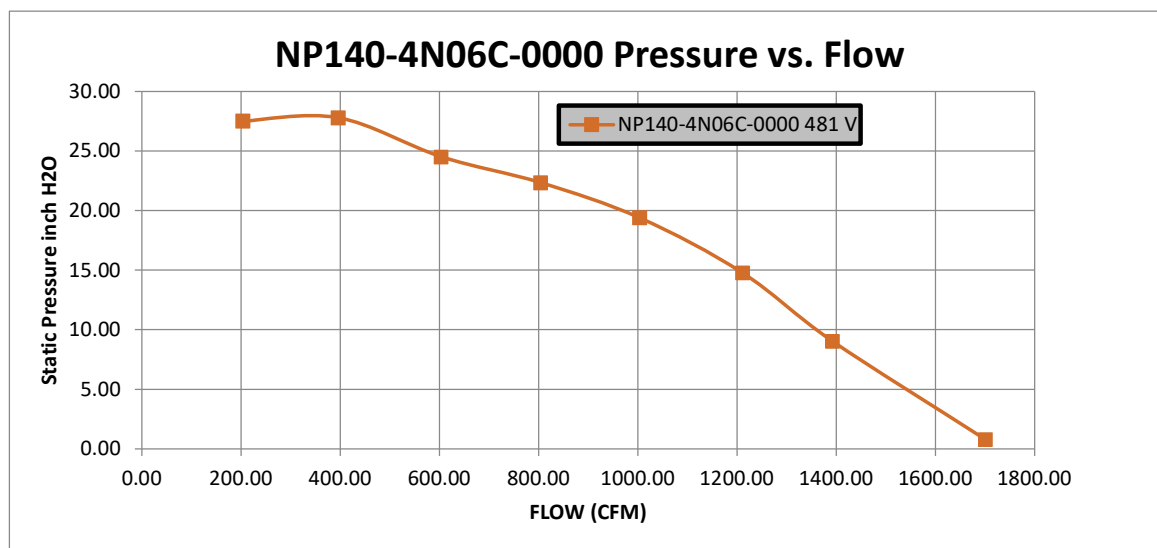
**OPERATING INPUT VOLTAGE: RANGE:**  
**380-575 VAC**  
**OPERATING INPUT VOLTAGE:** 480V 3Ø

**OPTIONAL FEATURES**

**SPEED CONTROL:** PWM, Open Loop, 4-Pin Power, 5-Pin Control, 3-Pin Status

**REGULATORY CERTIFICATIONS**

**COMPLIANCE:** RoHS and Reach  
**FULL LOAD AMPS:** 13A



Flow Rate <i>cfm</i>	Static Pressure <i>inch H2O</i>	Total Pressure <i>inch H2O</i>	Current <i>A</i>	Power Demand <i>W</i>	Voltage <i>V</i>	Flow Temp. <i>°C</i>	Rotational Speed <i>rpm</i>	Static Efficiency <i>%</i>	Total Efficiency <i>%</i>
1701.14	0.78	2.26	8.38	4233.22	480.63	21.14	6810	3.67	10.66
1392.98	9.02	10.01	8.62	4378.27	480.63	21.16	7530	33.71	37.42
1211.21	14.76	15.51	8.95	4574.64	480.61	21.21	8220	45.94	48.27
1003.96	19.39	19.91	8.76	4470.32	480.62	21.25	8880	51.17	52.53
804.31	22.33	22.66	8.03	4059.50	480.64	21.30	9210	51.99	52.76
603.70	24.50	24.69	7.27	3630.29	480.66	21.33	9570	47.88	48.24
396.13	27.79	27.87	6.51	3152.09	480.56	20.23	10020	41.04	41.15
203.79	27.49	27.51	5.38	2537.77	480.67	21.36	10050	25.96	25.98

**WARNING**

**DESIGN APPLICATION:** Designed to provide variable airflow for low NOx and CO emission in high efficiency gas fired combustion systems. Built with non-sparking materials. Blower housing assembly constructed of die cast aluminum. Impeller constructed from hardened aluminum. Rubber isolation mounts built into blower construction to dampen vibration within the motor. Two-piece blower housing assembly sealed, and factory leak checked. Customer is responsible to check for any leakage once the blower is installed into the final application.

**MISCELLANEOUS:** Motor cooling inlet and discharge vents must not be obstructed. Motor ventilation air to be free of oils and other foreign particles. Blower is to be mounted so ventilation air cannot be re-circulated.

# HP II series

CENTRIFUGAL BLOWER

engineering data  
and specifications



**CINCINNATI FAN** 

Since the founding of Cincinnati Fan in 1956, the company's mission has been to provide quality products at competitive prices, backed by depend-able service.

This mission is carried out by specializing in the market for industrial air handling products up to 125 hp. But specialization does not mean the product line is small. Cincinnati Fan offers a wide variety of standard and customized products, production flexibility, and customer responsiveness.

### CINCINNATI FAN PROVIDES

- ◆ Technical evaluation for correct performance conditions
- ◆ Review of air stream and ambient conditions that require special attention
- ◆ Selection of proper components to meet required design specifications
- ◆ Selection of proper accessories
- ◆ System analysis for proper fan design

Cincinnati Fan operates in a modern facility specifically designed for world class manufacturing enabling us to build standard products to order, including accessories, and ship within 5 to 10 working days.

With support like this, you can be sure your Cincinnati Fan product will be well-built and will provide maximum dependability and longevity.

Cincinnati Fan has over 170 experienced sales engineers across the US and Canada ready to serve your air handling needs.

### HP II SERIES SPECIFICATIONS

Radial bladed pressure blowers shall be Cincinnati Fan HP II series, Model \_\_\_\_\_, Arrangement \_\_\_\_\_.

Capacity: \_\_\_\_\_CFM, \_\_\_\_\_ Static Pressure at standard conditions.

Operating conditions: \_\_\_\_\_°F, \_\_\_\_\_ feet altitude

Backward inclined wheels shall have welded blades designed to meet AMCA Class \_\_\_\_\_ conditions.

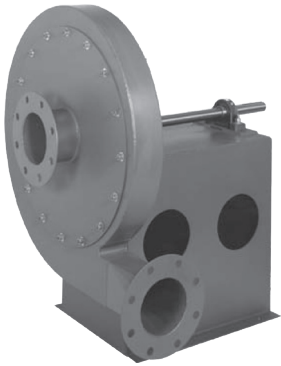
Wheels shall be dynamically balanced to assure smooth operation. Fan motor and bearing vibration levels shall not exceed 1.5 mils displacement at 3500 RPM. Shafts shall be turned, ground and polished steel (or stainless steel). All fan shafts shall receive a rust preventive coating prior to shipment. All fans shall be test run at factory before shipping.

All construction gauges shall be as shown in Cincinnati Fan's HP, Series II catalog, page 16. The blower housing shall be continuously welded and supported to minimize pulsation at all conditions. Fan bearings shall be grease-lubricated, heavy-duty, self-aligning ball bearings mounted in cast iron pillow blocks. V-belt drives shall be selected for a minimum of 1.3 times nominal horsepower.

All parts in contact with airstream shall be standard steel, aluminum or stainless steel as specified.

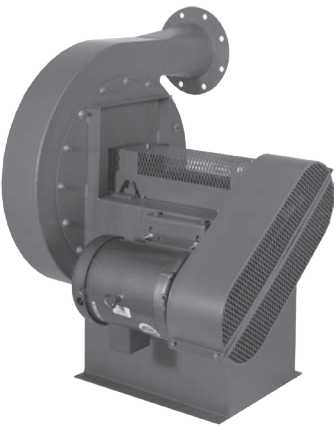
Before painting, steel parts shall be cleaned by detergent wash, phosphatized and painted with oven cured gray enamel.

The following accessories shall be included: (See page 5 for optional accessories).



### ARRANGEMENT 1 (Belt Drive)

- ♦ Motor not mounted on bearing base
- ♦ Wheel mounted on fan shaft with two pillow block bearings
- ♦ Maximum temperature at standard design 300°F, high temperature design 750°F

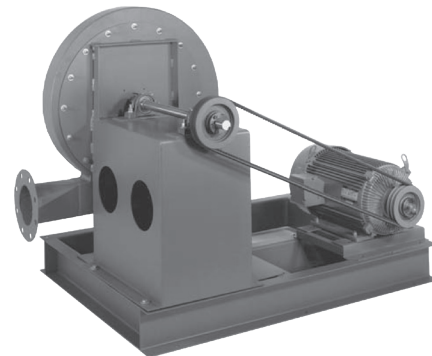


### ARRANGEMENT 8 (Direct Drive)

- ♦ Motor mounted on motor base extending beyond the bearing base
- ♦ Wheel mounted on fan shaft with two pillow block bearings
- ♦ Maximum temperature of standard design is 300°F, high temperature design 750°F
- ♦ Shown with shaft guard removed
- ♦ For dimensions contactd you local Cincinnati Fan sales representative

### ARRANGEMENT 9 (Belt Drive)

- ♦ Motor mounted on adjustable slide base on the side of the bearing base
- ♦ Wheel mounted on fan shaft with two pillow block bearings
- ♦ Maximum temperature of standard design is 300°F, high temperature design 750°F
- ♦ Shown with shaft guard option



### ARRANGEMENT 9 (Belt Drive)

- ♦ Same as Arrangement 9 except motor are mounted on a common channel base
- ♦ Maximum temperature of standard design is 300°F, high temperature design 750°F
- ♦ Shown with belt guard removed

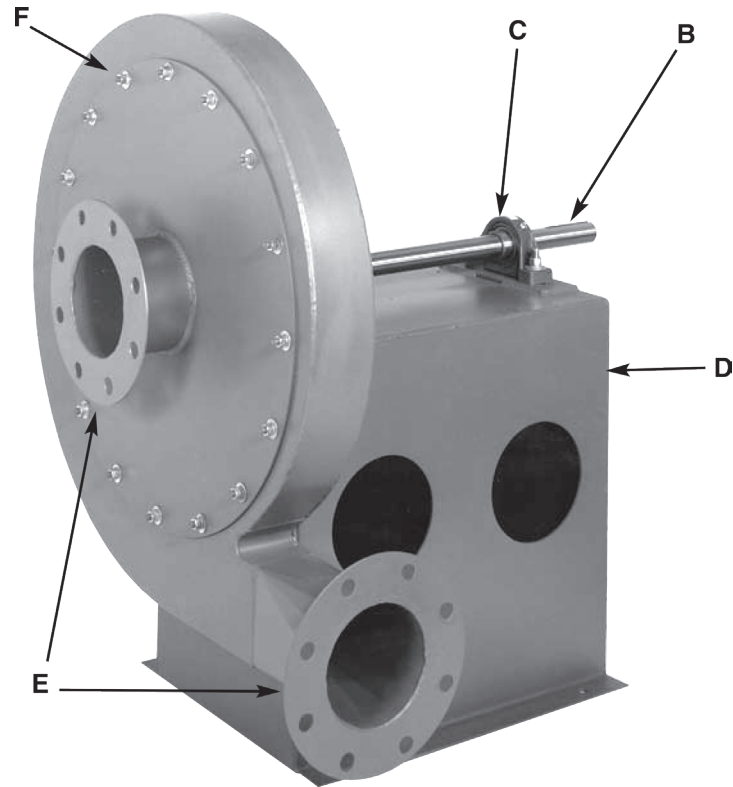


### ARRANGEMENT 4 and 4HM (Direct Drive)

- ♦ Motor mounted on motor base
- ♦ Wheel mounted on motor shaft
- ♦ Maximum temperature of standard design is 200°F, high temperature design 400°F
- ♦ Arrangement 4HM

## HP II SERIES FEATURES

- A - Wheels are fabricated of heavy-gauge, high-strength steel to assure long lasting, efficient operation. (not shown.)
- B - Turned, ground and polished shafting assures smooth operation. A rust preventative coating is applied prior to shipment.
- C - Heavy-duty, self-aligning ball bearings in relubricatable cast-iron pillow blocks. Bearings are selected for optimal performance depending on fan size.
- D - Bearing base is heavy steel construction with internal supports to maximize rigidity and assure long equipment life. Arrangement 1 fans can be converted to Arrangement 9 with the addition of the motor slide base.
- E - Flanged inlet and outlet standard. Drilled per ANSI 125 and ASA 150 specifications with holes straddling centers. See note \* on page 18.
- F - Reversible housing provides increased configuration flexibility. Removable side plates allow the wheel to be removed from the motor or inlet side of the housing. Housings are rotatable in 45° increments.
- G - Teflon shaft seal is standard. Ceramic seal is used for applications above 400°F. (not shown.)



### WARNING


The use of aluminum or aluminum alloys in the presence of steel which has been allowed to rust requires special consideration. Research by the U.S. Bureau of Mines and others has shown that aluminum impellers rubbing on rusty steel may cause high intensity sparking. The use of the above Standard in no way implies a guarantee of safety for any level of spark resistance. Spark-resistant construction also does not protect against ignition of explosive gases caused by catastrophic failure or from any airstream material that may be present in a system.

## SPARK-RESISTANT CONSTRUCTION

**Type A:** All parts in contact with airstream are of nonferrous material. Maximum temperature 200°F. Consult factory..

**Type B:** Fabricated aluminum wheel and aluminum rubbing ring on fan shaft. Maximum temperature 200°F.

**Type C:** Consists of aluminum iplate on drive side of the fan and aluminum inlet plate assembly. Maximum Temperature is 750°F.

 **Caution—** All fans and blowers shown have rotating parts and pinch points. Severe personal injury can result if operated without guards. Stay away from rotating equipment unless it is disconnected from its power source. Read and understand operating instructions.

OPTIONS



**Belt Guard**

Belt guard standard on Arrangement 9 and 9CB only. Painted safety yellow.



**Shaft and/or Heat Slinger Guard**

Guard available on Arrangement 1, 9 and 9CB. Covers bearings and shaft between fan housing and belt guard. Bearings can be relubricated through belt guard. Painted safety yellow.



**Drain Connection**

3/4" pipe coupling welded to lowest point of housing. Not required on BH discharge position.



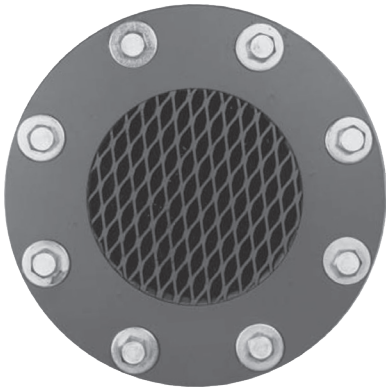
**Inspection Door**

Bolted or quick-release doors positioned as specified on scroll. Rubber gasket standard up to 250°F (121°C) Ceramic fiber gasket standard at temperatures above 250°F (122°C).



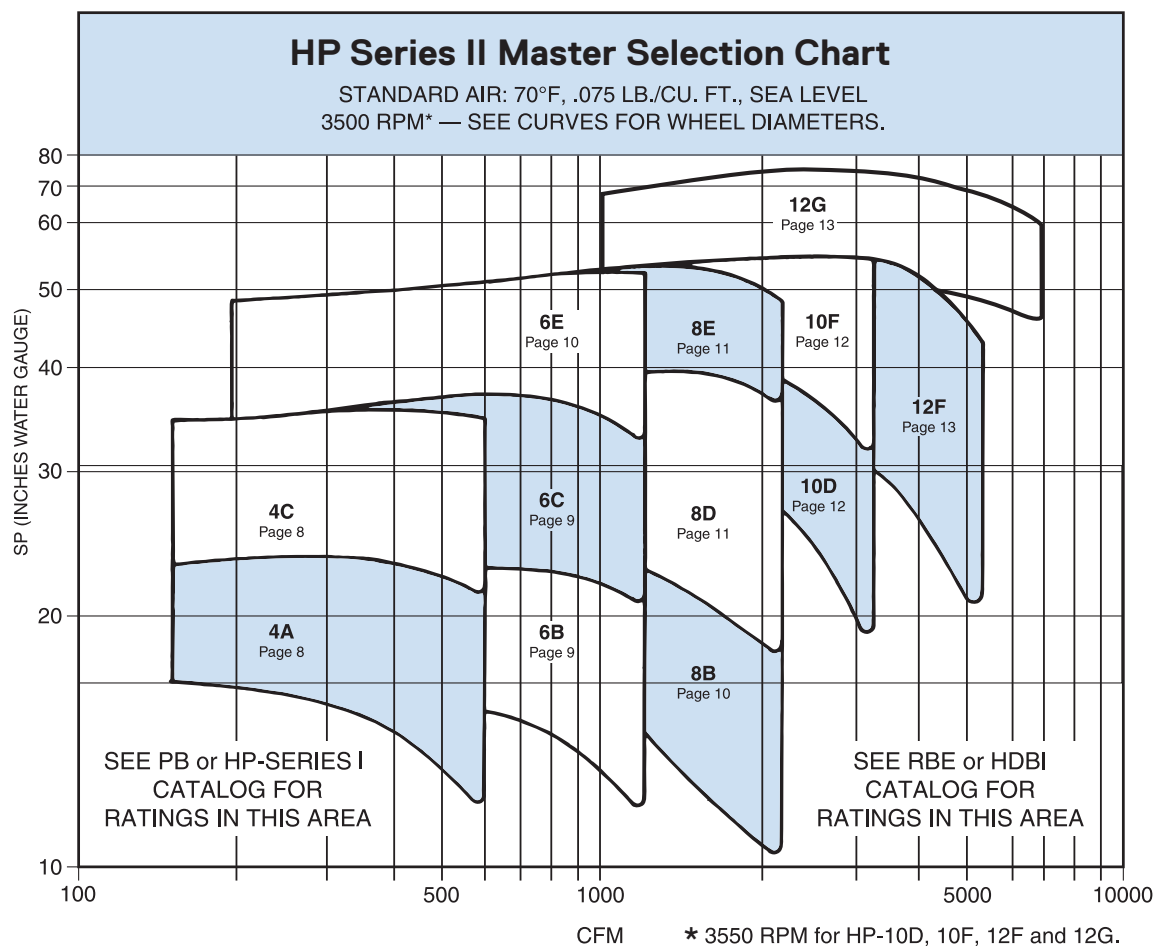
**Inlet Bell**

Equipped with OSHA guard



**OSHA Type Outlet Guard**





## SELECTION CHART INSTRUCTIONS

The chart is intended to guide you to the correct fan for a desired performance rating. This chart was prepared for standard air (70°F, 29.92" Hg barometric pressure and .075 lb per cubic foot density).

All fans were tested with an inlet bell. All performance curves in this catalog are for standard air, at the fan inlet, entering the inlet (whether belled or ducted) with static pressure measured at the discharge.

Corrections are required for temperature and/or altitude and rarefaction. See page 7 for correction factors.

**Rarefaction:** When air is pulled into a blower inlet (negative pressure) the air molecules are "stretched out", or rarefied, and become less dense than at the blower discharge where the air is compressed.

Catalog ratings may be used directly, without correction, for static pressures defined at the fan discharge. For static pressures defined at the fan inlet (i.e. negative pressures), a correction is typically only made for inlet suction pressures greater than 15" W.G. See page 7 for details.

## HIGH TEMPERATURE CONSTRUCTION

### Arrangement 4 and 4HM

Up to 200°F

Standard fan construction

201°F - 400°F

Standard fan with shaft seal, heat slinger, slinger guard and external hub on wheel

### Arrangement 1, 8, 9 and 9CB

Up to 300°F

Standard fan construction

301° - 400°F

Standard fan with heat slinger and shaft/slinger guard

401°F - 600°F

Standard fan with heat slinger, shaft/slinger guard and high temperature shaft seal, gaskets and paint

601°F - 750°F

Standard fan with heat slinger, shaft/slinger guard, 316 stainless steel fan shaft and high temperature shaft seal, gaskets and paint

Temperature Range °F	Maximum RPM Reduction Factor†
Up to 175°	0%
176° - 200°	2%
201° - 300°	4%
301° - 400°	7%
401° - 500°	11%
501° - 600°	15%
601° - 700°	20%
701° - 750°	30%

† Steel wheels only

## TEMPERATURE - ALTITUDE ADJUSTMENT

Air Temperature °F	Altitude in Feet Above Sea Level										
	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
0°	0.87	0.91	0.94	0.98	1.01	1.05	1.09	1.13	1.17	1.22	1.26
40°	0.94	0.98	1.02	1.06	1.10	1.14	1.19	1.23	1.28	1.32	1.36
70°	1.00	1.04	1.08	1.12	1.16	1.20	1.25	1.30	1.35	1.40	1.45
80°	1.02	1.06	1.10	1.14	1.19	1.23	1.28	1.33	1.38	1.43	1.48
100°	1.06	1.10	1.14	1.19	1.23	1.28	1.33	1.38	1.43	1.48	1.54
120°	1.09	1.14	1.18	1.23	1.28	1.32	1.38	1.43	1.48	1.53	1.58
140°	1.13	1.18	1.22	1.27	1.32	1.37	1.42	1.48	1.54	1.58	1.65
160°	1.17	1.22	1.26	1.31	1.36	1.42	1.47	1.53	1.59	1.64	1.70
180°	1.21	1.26	1.30	1.36	1.41	1.46	1.52	1.58	1.64	1.70	1.75
200°	1.25	1.29	1.34	1.40	1.45	1.51	1.57	1.63	1.69	1.75	1.81
250°	1.34	1.39	1.45	1.50	1.56	1.62	1.68	1.74	1.82	1.88	1.94
300°	1.43	1.49	1.55	1.61	1.67	1.74	1.80	1.87	1.94	2.00	2.08
350°	1.53	1.59	1.65	1.72	1.78	1.85	1.92	2.00	2.07	2.14	2.22
400°	1.62	1.69	1.75	1.82	1.89	1.96	2.04	2.12	2.20	2.27	2.35
450°	1.72	1.79	1.86	1.93	2.00	2.08	2.16	2.24	2.33	2.41	2.50
500°	1.81	1.88	1.96	2.03	2.11	2.19	2.28	2.36	2.46	2.54	2.62
550°	1.91	1.98	2.06	2.14	2.22	2.30	2.40	2.49	2.58	2.68	2.77
600°	2.00	2.08	2.16	2.24	2.33	2.42	2.50	2.61	2.71	2.80	2.90
650°	2.10	2.18	2.26	2.35	2.44	2.54	2.63	2.74	2.84	2.94	3.04
700°	2.19	2.27	2.36	2.46	2.55	2.65	2.75	2.86	2.97	3.06	3.18
750°	2.28	2.37	2.47	2.56	2.66	2.76	2.87	2.98	3.10	3.19	3.31

Fan performance tables are developed using standard air which is 70°F, 29.92" barometric pressure and .075 lb/ft<sup>3</sup> per cubic foot. Density changes resulting from temperature or barometric pressure variations (such as higher altitudes) must be corrected to standard conditions before selecting a fan based on standard performance data. Temperature and/or altitude conversion factors are used in making corrections to standard conditions.

**EXAMPLE:** Select an HP Series II fan to deliver 4800 CFM at 30" SP at 160°F and 7000' altitude.

Step 1 - From the table, conversion factor is 1.53.

Step 2 - Correct static pressure is:

$$1.53 \times 30" \text{ SP} = 45.9" \text{ SP at standard conditions.}$$

Step 3 - Check HP Series II catalog for 4800 CFM at 45.9" SP. We select an HP12F with a 26" diameter wheel at 3500 RDPM and 56 bhp.

Step 4 - Correct the bhp for the lighter air:

$$56 \div 1.53 = 36.6 \text{ bhp.}$$

A 40 hp motor will suffice at 160° F and 7000' but not at standard conditions. Special motor insulation may be required above 3500 feet altitude. Consult factory.

Suction Pressure inches WG	Corrected Static Pressure
16	16.7
18	18.8
20	21.0
22	23.3
24	25.6
26	27.8
28	30.1
30	32.4
32	34.7
34	37.1
36	39.5
38	41.9
40	44.4
42	46.8

Suction Pressure inches WG	Corrected Static Pressure
44	49.3
46	51.9
48	54.4
50	57.0
52	59.6
54	62.2
56	64.9
58	67.6
60	70.4
62	73.2
64	75.9
66	78.8
68	81.6
70	84.5

## SUCTION PRESSURE CORRECTION

Suction pressure tables give corrected static pressures for suction pressure (rarefaction). These corrected static pressures are for standard air (70°F, 29.92" Hg barometric pressure and .075 lb per cubic foot density) at the blower inlet.

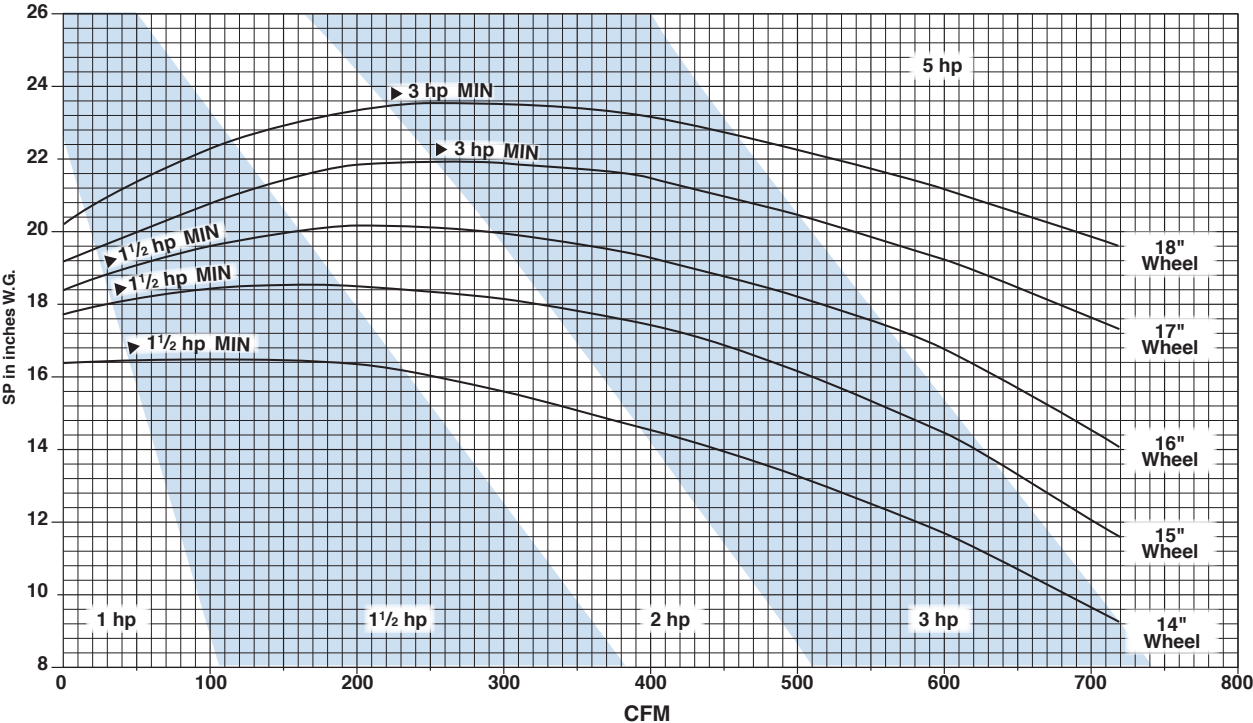
If the inlet air temperature and/or altitude are different, make those corrections as shown above and then correct for rarefaction.

**DIRECT DRIVE RATINGS @ 3500 RPM**

CFM and bhp at Static Pressure Shown – Ratings at 70°F – .075" Density – Sea Level

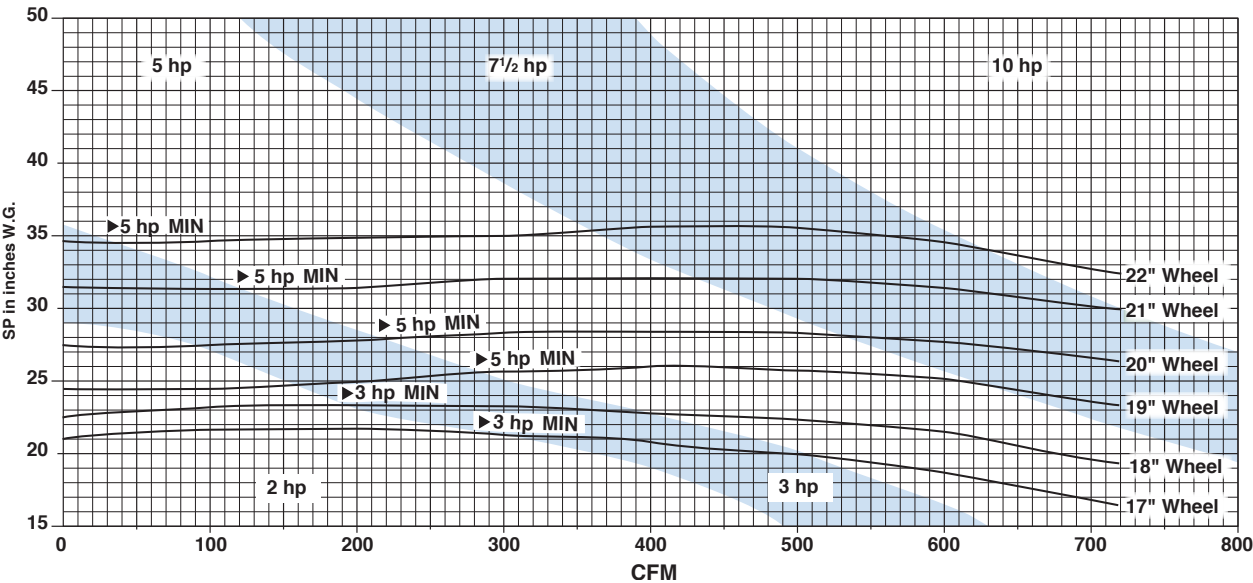
**Model HP-4A**

bhp values are shown. Note ► is minimum hp motor needed for required starting torque ( $WR^2$ ) for steel wheels. See page 14.



**Model HP-4C**

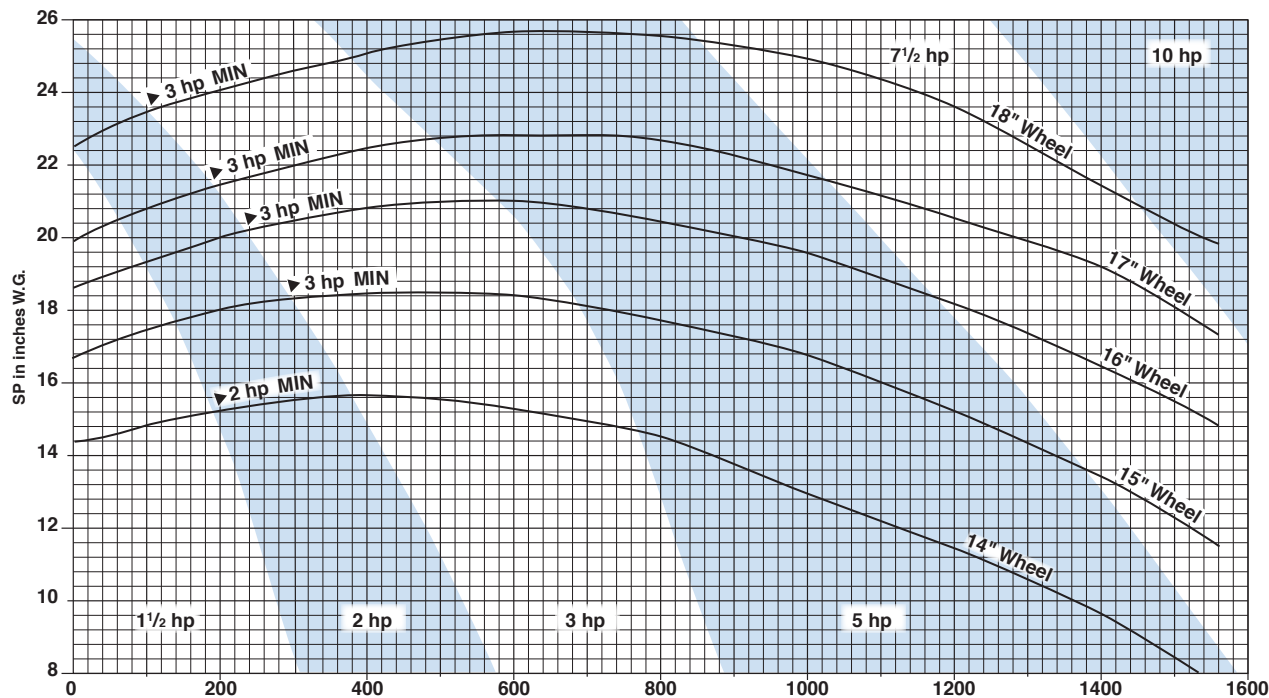
bhp values are shown. Note ► is minimum hp motor needed for required starting torque ( $WR^2$ ) for steel wheels. See page 14.



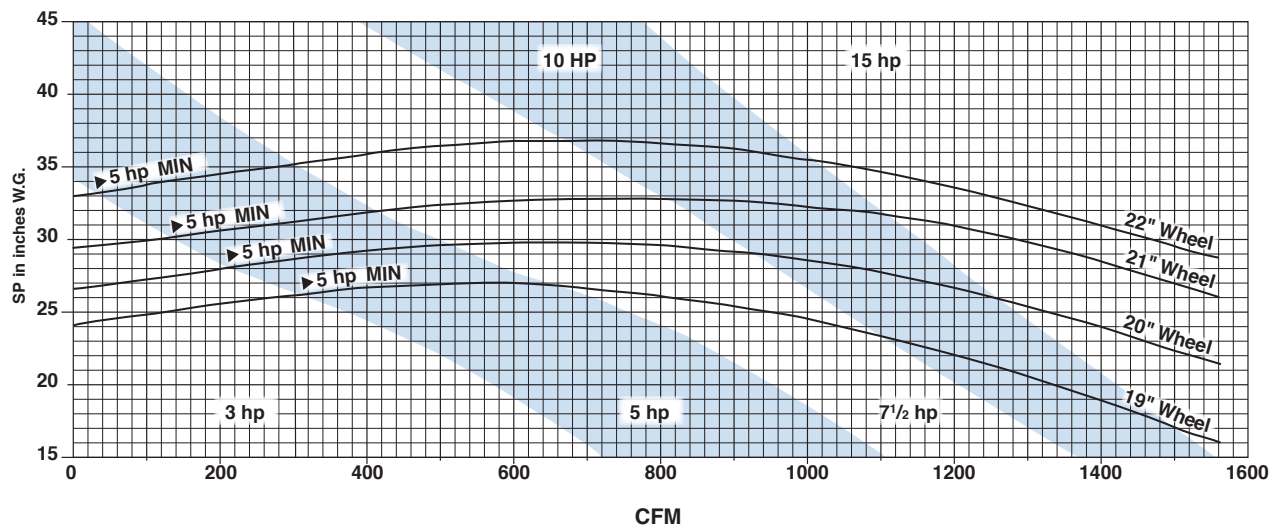
DIRECT DRIVE RATINGS @ 3500 RPM

CFM and bhp at Static Pressure Shown – Ratings at 70°F – .075" Density – Sea Level

**Model HP-6B** bhp values are shown. Note ► is minimum hp motor needed for required starting torque (WR<sup>2</sup>) for steel wheels. See page 14.



**Model HP-6C** bhp values are shown. Note ► is minimum hp motor needed for required starting torque (WR<sup>2</sup>) for steel wheels. See page 14.

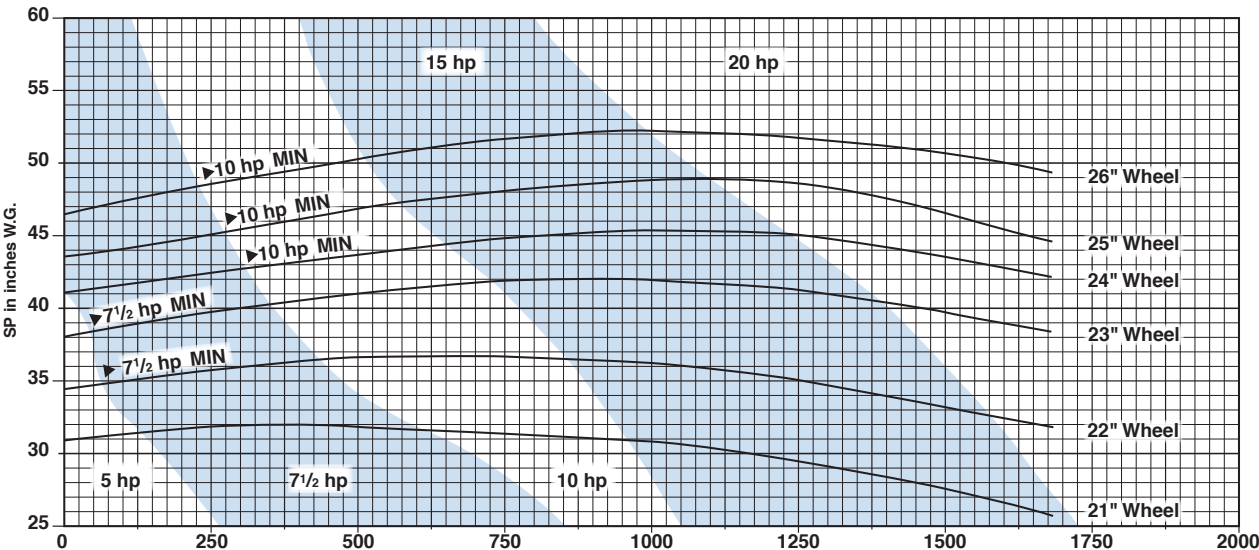


**DIRECT DRIVE RATINGS @ 3500 RPM**

CFM and bhp at Static Pressure Shown – Ratings at 70°F – .075" Density – Sea Level

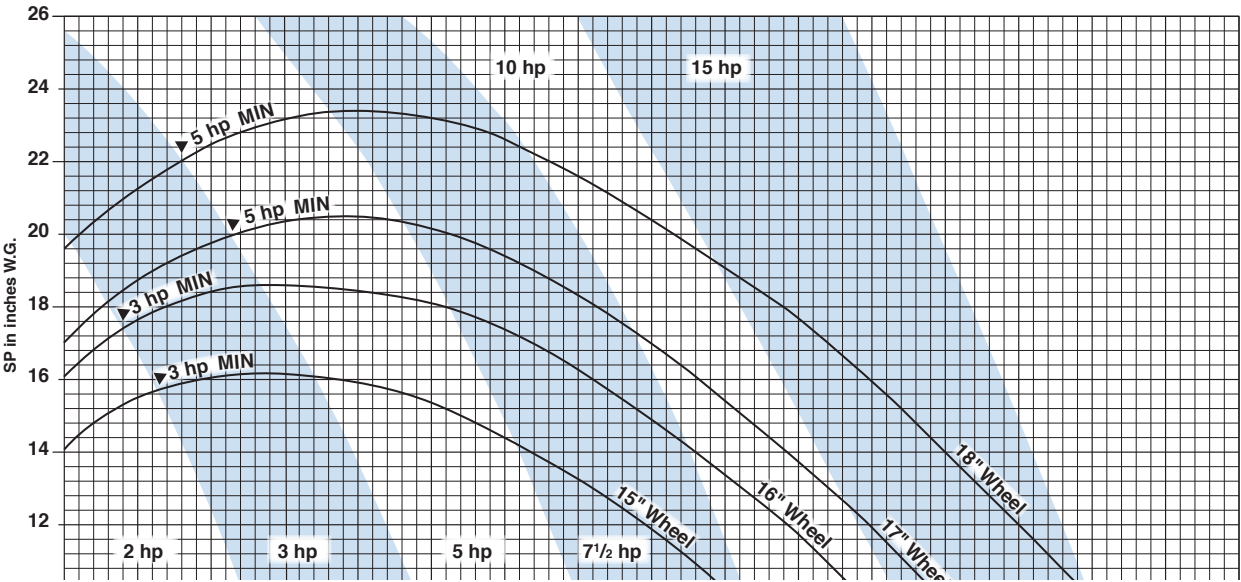
**Model HP-6E**

bhp values are shown. Note ► is minimum hp motor needed for required starting torque ( $WR^2$ ) for steel wheels. See page 14.



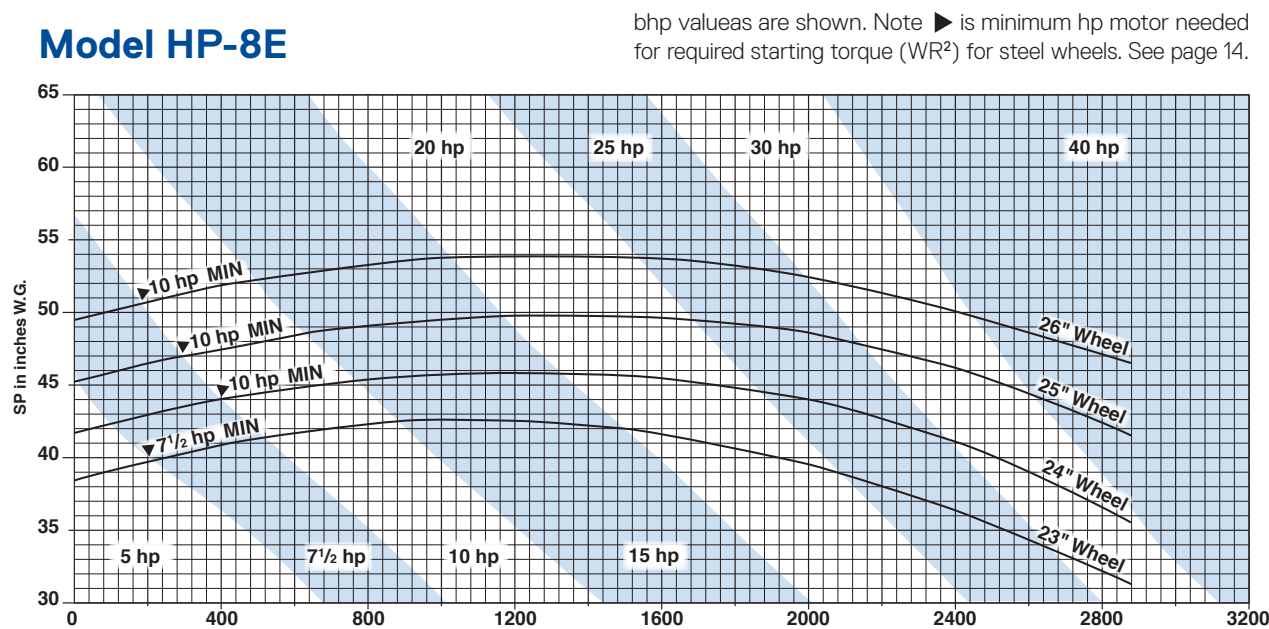
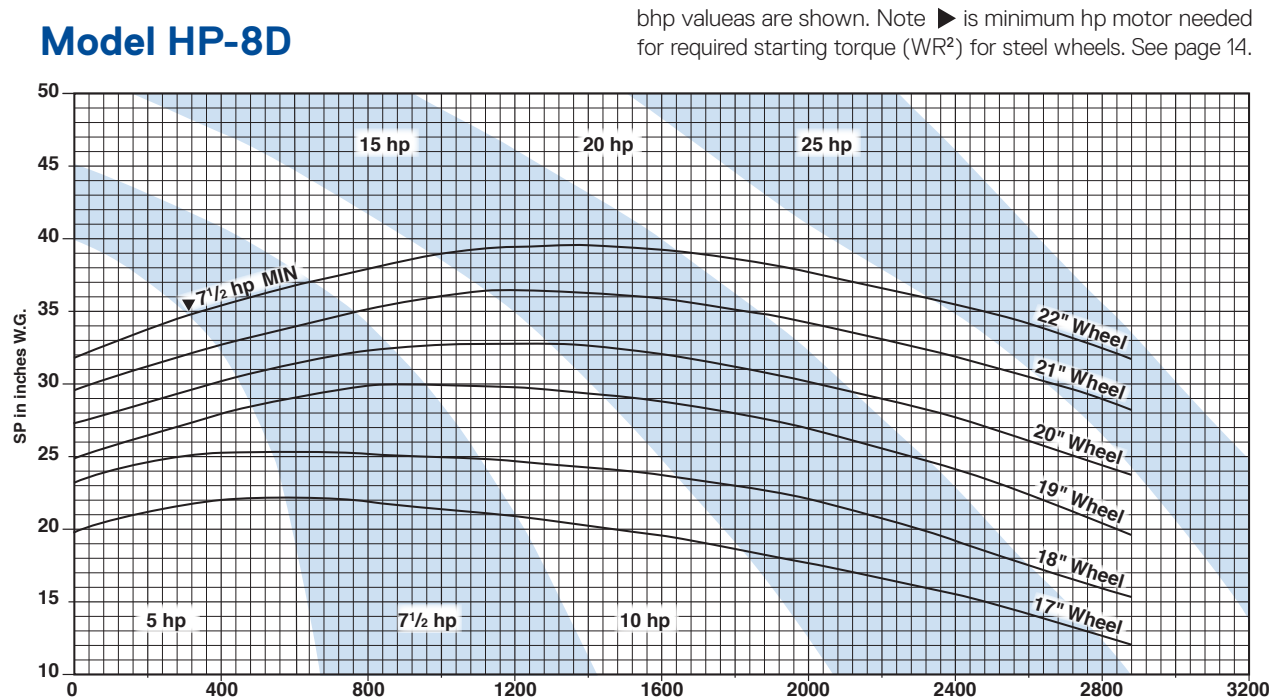
**Model HP-8B**

bhp values are shown. Note ► is minimum hp motor needed for required starting torque ( $WR^2$ ) for steel wheels. See page 14.



DIRECT DRIVE RATINGS @ 3500 RPM

CFM and bhp at Static Pressure Shown – Ratings at 70°F – .075" Density – Sea Level

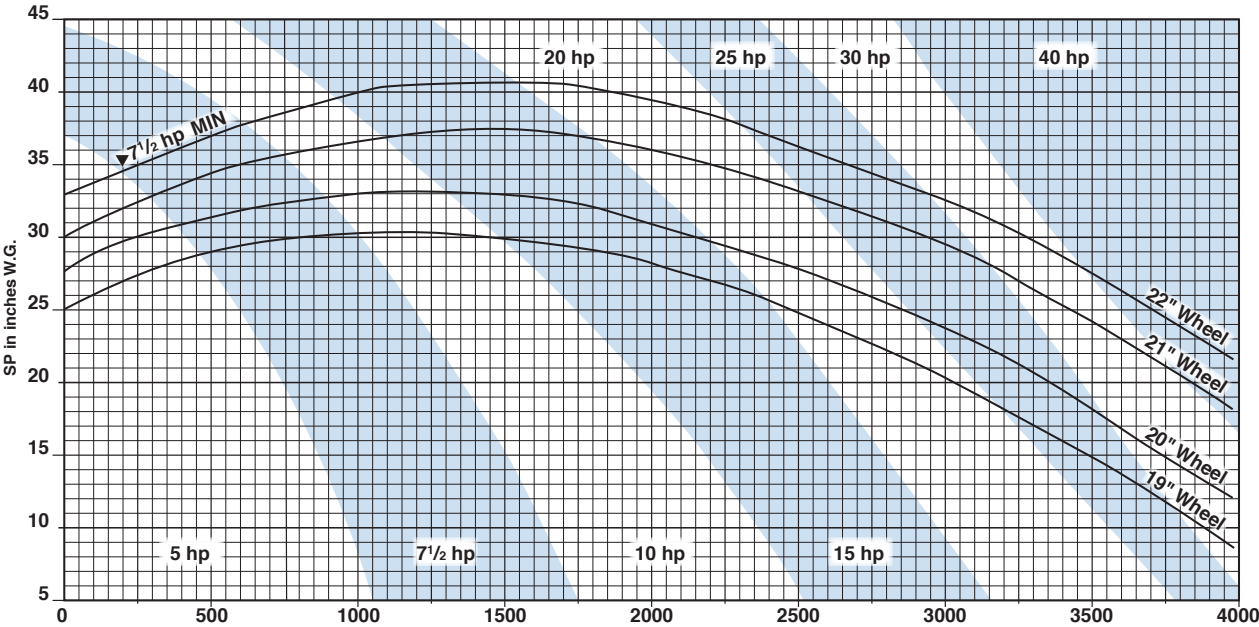


**DIRECT DRIVE RATINGS @ 3500 RPM**

CFM and bhp at Static Pressure Shown – Ratings at 70°F – .075" Density – Sea Level

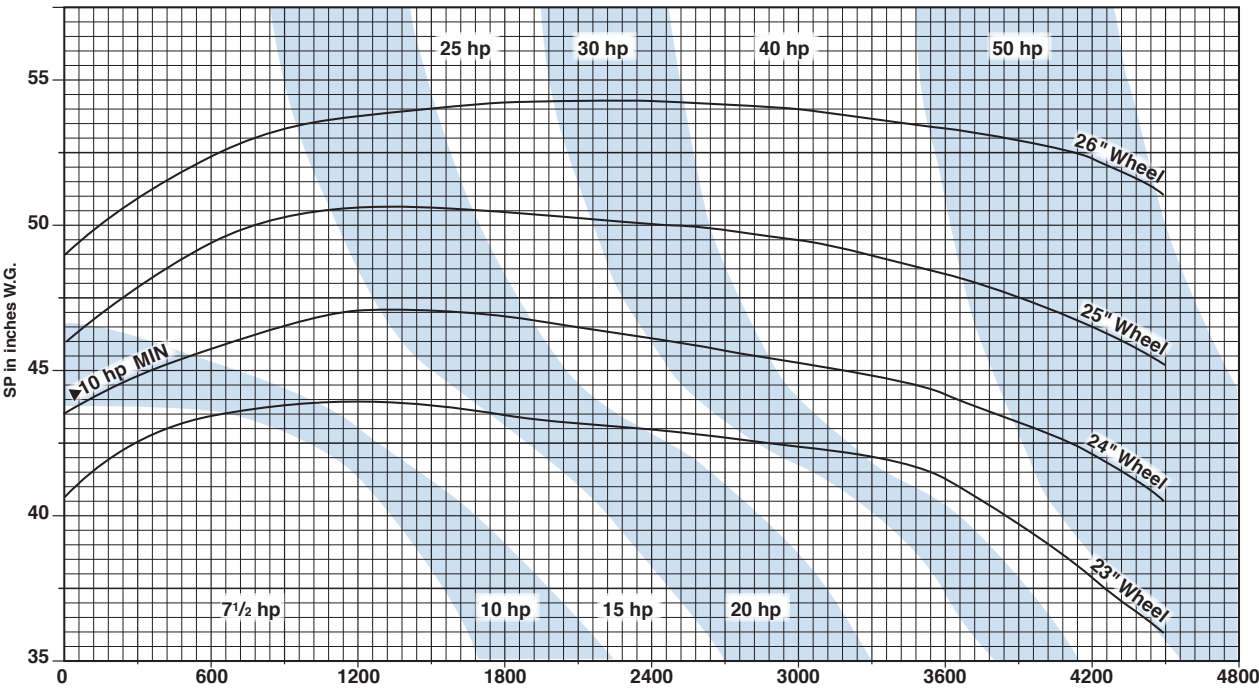
**Model HP-10D**

bhp values are shown. Note ► is minimum hp motor needed for required starting torque ( $WR^2$ ) for steel wheels. See page 14.

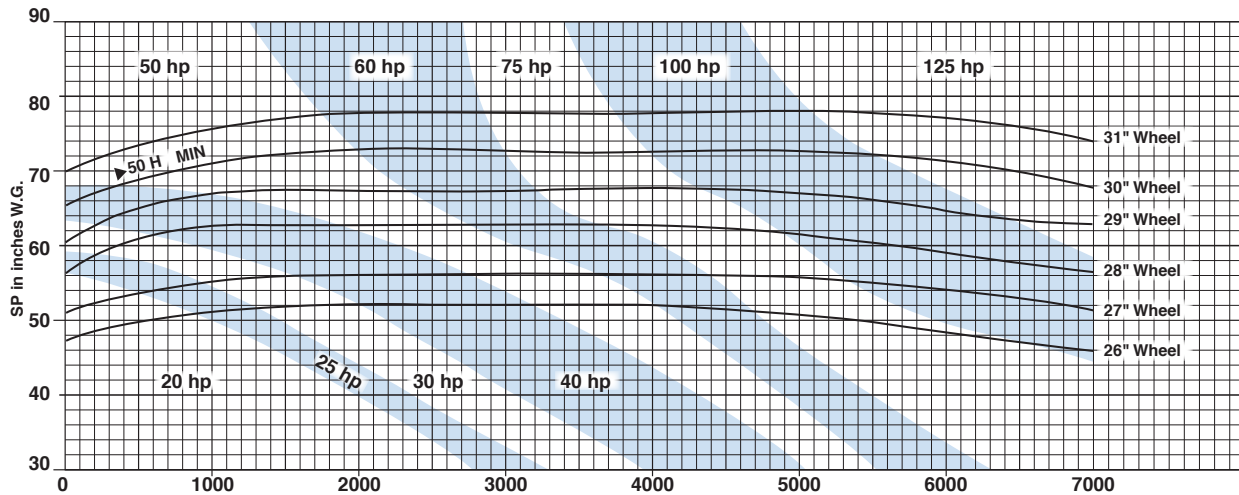


**Model HP-10D**

bhp values are shown. Note ► is minimum hp motor needed for required starting torque ( $WR^2$ ) for steel wheels. See page 14.









## HP STEEL WHEEL WR<sup>2</sup> VALUES AND MINIMUM MOTOR HORSEPOWER

Model	WR <sup>2</sup> (lb-ft <sup>2</sup> )	Minimum hp*
HP-4A14	3.4	1.5
HP-4A15	4.4	1.5
HP-4A16	5.7	1.5
HP-4A17	7.2	3
HP-4A18	9.0	3
HP-4C17	7.2	3
HP-4C18	9.0	3
HP-4C19	11.0	5
HP-4C20	13.5	5
HP-4C21	16.2	5
HP-4C22	19.4	5
HP-6B14	3.5	2
HP-6B15	4.6	3
HP-6B16	6.0	3
HP-6B17	7.6	3
HP-6B18	9.6	3
HP-6C19	11.0	5
HP-6C20	13.5	5
HP-6C21	16.2	5
HP-6C22	19.4	5
HP-6E21	19.1	5
HP-6E22	22.2	7.5
HP-6E23	23.8	7.5
HP-6E24	28.1	10
HP-6E25	32.9	10
HP-6E26	28.1	10
HP-8B15	4.6	3
HP-8B16	6.0	3
HP-8B17	7.6	5
HP-8B18	9.6	5

Model	WR <sup>2</sup> (lb-ft <sup>2</sup> )	Minimum hp*
HP-8D17	7.6	5
HP-8D18	9.6	5
HP-8D19	11.9	5
HP-8D20	14.5	5
HP-8D21	17.6	5
HP-8D22	21.0	7.5
HP-8E23	23.8	7.5
HP-8E24	28.0	10
HP-8E25	32.9	10
HP-8E26	38.3	10
HP-10D19	11.9	5
HP-10D20	14.5	5
HP-10D21	17.6	5
HP-10D22	21.1	7.5
HP-10F23	26.7	7.5
HP-10F24	31.5	10
HP-10F25	36.8	10
HP-10F26	42.7	15
HP-12F21	19.0	5
HP-12F22	23.0	7.5
HP-12F23	26.7	7.5
HP-12F24	31.5	10
HP-12F25	36.8	10
HP-12F26	42.7	15
HP-12G26	72.0	20
HP-12G27	83.0	20
HP-12G28	95.0	20
HP-12G29	108.0	25
HP-12G30	123.0	50
HP-12G31	138.0	50

**\*Minimum Horsepower:** This is the suggested minimum motor horsepower for Arrangement 4 fans with a nominal 3500 RPM motor speed. In a few situations motors suitable for the fan operating point bhp may not have sufficient torque to start the fan as quickly as desired. Therefore, use a motor horsepower at least as large as those listed in the tables. The suggested motor horsepower values are based on typical Baldor three phase motors. Motor starting torques from other vendors will vary. These tables do not apply to Arrangement 4 fans with 1750 RPM and 2850 RPM motors, and any belt driven fan. A smaller horsepower motor may be acceptable for some of these applications.

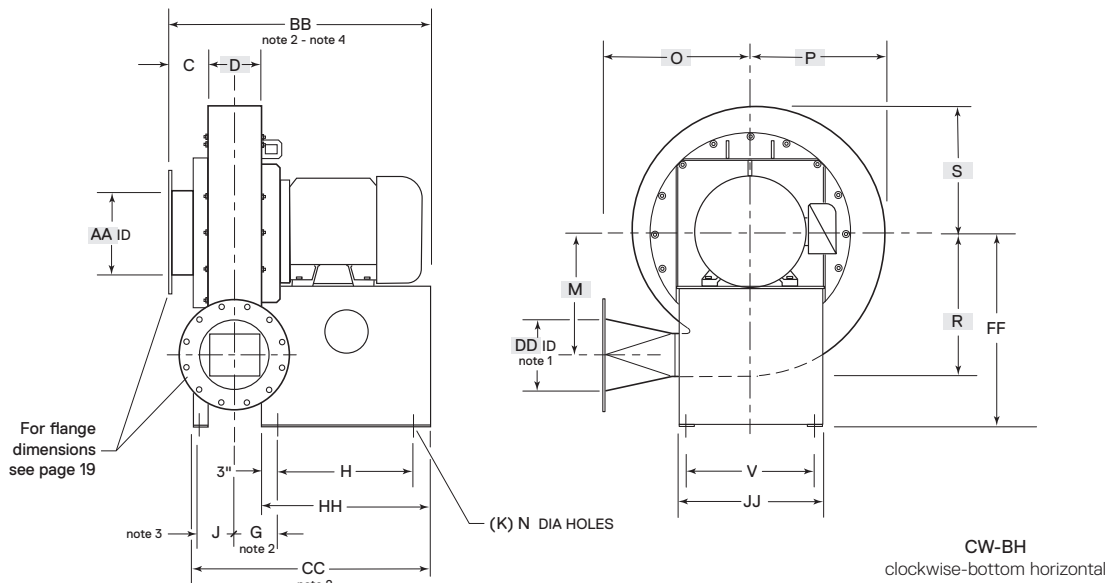
**Note**—Blower housing dimensions common to all arrangements on pages 15, 17 and 18

Model*	D	M	O	P	R	S	AA	DD**
HP-4A	4"	11 3/4"	18"	13 9/16"	14 3/8"	12 3/4"	6	4
HP-4C	4"	14 13/16"	17 7/8"	16 7/16"	17 7/16"	15 7/16"	6	4
HP-6B	6 3/8"	11 3/4"	18"	13 9/16"	14 3/8"	12 3/4"	8	6
HP-6C	4"	14 13/16"	17 7/8"	16 7/16"	17 7/16"	15 7/16"	6	6
HP-6E	5 3/8"	17 7/16"	19 1/8"	19 3/8"	20 9/16"	18 3/16"	8	6
HP-8B	6 3/8"	11 3/4"	19 13/16"	13 9/16"	14 3/8"	12 3/4"	8	8
HP-8D	6 3/8"	14 13/16"	19 3/4"	16 7/16"	17 7/16"	15 7/16"	8	8
HP-8E	5 3/8"	17 7/16"	21"	19 3/8"	20 9/16"	18 3/16"	8	8
HP-10D	6 3/8"	14 13/16"	21 3/4"	16 7/16"	17 7/16"	15 7/16"	8	10
HP-10F	7 3/8"	17 7/16"	23"	19 3/8"	20 9/16"	18 3/16"	10	10
HP-12F	7 3/8"	17 7/16"	2"	19 3/8"	20 9/16"	18 3/16"	10	12
HP-12G	9"	20 3/4"	24 15/16"	23 1/16"	24 7/16"	21 5/8"	14	12

\*Complete model number includes wheel diameter

\*\* Discharge flange not available with downblast discharge on models HP-8B, HP10D, HP-12F and HP-12G

## ARRANGEMENT 4 — DIRECT DRIVE



**Note**—For common boxed blower housing dimensions, see page 14

Model*	Motor Frame	C	G note 2	H	J note 3	K	N	V	BB note 2-4	CC note 2-4	FF	HH	JJ
HP-4A	142T-184T	4 1/2"	5"	6 3/4"		4	9/16"	14 3/4"	21 1/4"		21"	12 3/4"	16 3/4"
HP-4C	143T-215T	4 1/2"	5"	9"		4	9/16"	17"	23 1/2"		25"	15"	19"
	254T-256T	4 1/2"	5"	14"		4	9/16"	17"	28 1/2"		25"	20"	19"
HP-6B	143T-184T	4 1/2"	6 3/16"	6 3/4"		4	9/16"	14 3/4"	23 5/8"		21"	12 3/4"	16 3/4"
	213T-215T	4 1/2"	6 3/16"	12 1/2"		4	9/16"	14 3/4"	29 5/8"		21"	18 1/2"	16 3/4"
HP-6C	143T-215T	4 1/2"	5"	9"		4	9/16"	17"	23 1/2"		25"	15"	19"
	254T-256T	4 1/2"	5"	14"		4	9/16"	17"	28 1/2"		25"	20"	19"
HP-6E	184T-256T	4 1/2"	5 11/16"	13"		4	9/16"	19"	28 7/8"		29"	19"	21"
HP-8B	143T-184T	4 1/2"	6 3/16"	6 3/4"		4	9/16"	14 3/4"	23 5/8"		21"	12 3/4"	16 3/4"
	213T-256T	4 1/2"	6 3/16"	12 1/2"		4	9/16"	14 3/4"	29 5/8"		21"	18 1/2"	16 3/4"
HP-8D	182T-215T	4 1/2"	6 3/16"	9"		4	9/16"	17"	25 7/8"		25"	15"	19"
	254T-286TS	4 1/2"	6 3/16"	14"		4	9/16"	17"	30 7/8"		25"	20"	19"
HP-8E	184T-256T	4 1/2"	5 11/16"	13"		4	9/16"	19"	28 7/8"		29"	19"	21"
	284TS-286TS	4 1/2"	5 11/16"	15 1/2"		4	9/16"	19"	31 3/8"		29"	21 1/2"	21"
HP-10D	184T-215T	4 1/2"	6 3/16"	9"		4	9/16"	17"	25 7/8"		25"	15"	19"
	254T-286TS	4 1/2"	6 3/16"	14"		4	9/16"	17"	30 7/8"		25"	20"	19"
HP-10F	215T-256T	4 1/2"	6 11/16"	13"		4	9/16"	19"	30 7/8"		29"	19"	21"
	284TS-326TS	4 1/2"	6 11/16"	15 1/2"		4	9/16"	19"	33 3/8"		29"	21 1/2"	21"
	364TS-365TS	4 1/2"	6 11/16"	22"		4	9/16"	19"	39 7/8"		29"	28"	21"
HP-12F	184T-256T	4 1/2"	6 11/16"	13"		4	9/16"	19"	30 7/8"		29"	29"	21"
	284TS-326TS	4 1/2"	6 11/16"	15 1/2"		4	9/16"	19"	33 3/8"		29"	29"	21"
	364TS-365TS	4 1/2"	6 11/16"	22"		4	9/16"	19"	39 7/8"		29"	29"	21"
HP-12G	254T-256T	6 1/2"	7 1/2"	13"		6	3/4"	22"	34 1/2"	54 15/16"	33"	19"	24"
	284T-326T	6 1/2"	7 1/2"	21"		6	3/4"	22"	42 1/2"	59 15/16"	33"	27"	24"
	364T-365T	6 1/2"	7 1/2"	23"		6	3/4"	22"	44 1/2"	63 5/16"	33"	29"	24"
	404T-405T	6 1/2"	7 1/2"	26"		6	3/4"	22"	43 1/2"	62 5/16"	33"	32"	24"
	444TS	6 1/2"	7 1/2"	30"	6"	6	3/4"	22"	47 1/2"	66 5/16"	33"	36"	24"

\*Complete model number includes wheel diameter

1 Discharge flange not available with Downblast (DB) discharge position on models HP-8B, HP-10D, HP-12F and HP-12G.

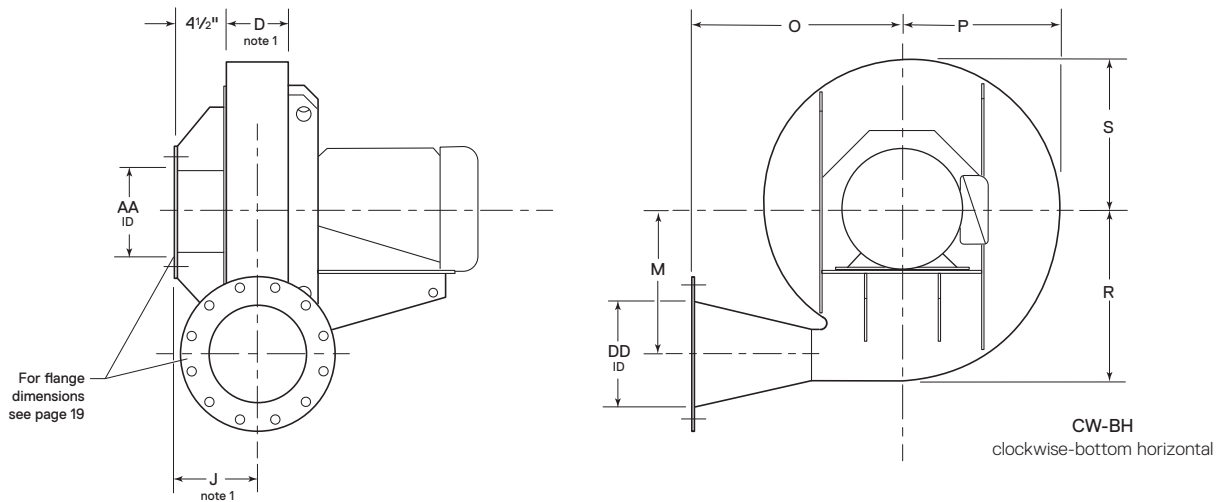
2 For AMCA Type C spark resistant construction, add 1/8" to dimensions G, BB and CC.

3 Inlet side support plate is only included on model HP-12G.

4 On some models, motor may extend past end of motor base.

5 Fan housings are reversible and rotatable in 45° increments.°

## ARRANGEMENT 4HM — DIRECT DRIVE



Model*	Motor Frame	D note 1	J note 1	M	O	P	R	S	AA	DD
HP-4A	143T-184T	4"	6 1/2"	11 3/4"	18"	13 9/16"	14 3/8"	12 3/4"	6	4
HP-4C	143T-256T	4"	6 1/2"	14 13/16"	17 15/16"	16 7/16"	17 7/16"	15 7/16"	6	4
HP-6B	143T-2154T	6 3/8"	7 11/16"	11 3/4"	18"	13 9/16"	14 3/8"	12 3/4"	8	6
HP-6C	143T-256T	4"	6 1/2"	14 13/16"	17 15/16"	16 7/16"	17 7/16"	15 7/16"	6	6
HP-6E	184T-256T	5 3/8"	7 3/16"	17 7/16"	19 3/16"	19 3/8"	20 9/16"	18 3/16"	8	6
HP-8B	143T-254T	6 3/8"	7 11/16"	11 3/4"	19 13/16"	13 9/16"	14 3/8"	12 3/4"	8	8
HP-8D	182T-286TS	6 3/8"	7 11/16"	14 13/16"	19 3/4"	16 7/16"	17 7/16"	15 7/16"	8	8
HP-8E	213T-286TS	5 3/8"	7 3/16"	17 7/16"	21"	19 3/8"	20 9/16"	18 3/16"	8	8
HP-10D	184T-286TS	6 3/8"	7 11/16"	14 13/16"	21 3/4"	16 7/16"	17 7/16"	15 7/16"	8	10
HP-10F	215T-326TS	7 3/8"	8 3/16"	17 7/16"	23"	19 3/8"	20 9/16"	18 3/16"	10	10
HP-12F	184T-326TS	7 3/8"	8 3/16"	17 7/16"	23"	19 3/8"	20 9/16"	18 3/16"	10	12

\*Complete model number includes wheel diameter

1 For AMCA Type C spark resistant construction, add 1/4" to dimension D.

2 Fan housings are reversible and rotatable in 45° increments.

## Construction Gauge

Model	Inlet			Outlet Flange	Housing			Wheel			All Bases
	Side Plate	Inlet Collar	Inlet Flange		Side Plate	Scroll	Transition	Shroud	Blades	Back Plate	
HP-4A and HP-4C	7	10	10	10	7	10	14	7	10	7	7
HP-6B and HP-6E	7	10	7	10	7	10	14	7	10	7	7
HP-6C	7	10	10	10	7	10	14	7	10	7	7
HP-6E	7	10	7	10	7	10	14	7	10	7	7
HP-8B through HP-12F	7	10	7	10	7	10	14	7	10	1/4"	7
HP-12G	1/4"	10	7	7	1/4"	10	14	1/4"	10	1/4"	7

Technical drawings of the CW-BH unit, showing front and side views with dimensions and labels.

**Front View (Left):**

- Dimensions: C, D, BB (note 2 - 4), F, AA ID, J, 3", H, HH, MML (note 4), CC (note 2), G (note 2).
- Labels: Y DIAMETER SHAFT, Z KEY SIZE SQUARE, BELT GUARD (note 5), (K) N DIA HOLES.
- Note: For flange dimensions see page 19.

**Side View (Right):**

- Dimensions: O, P, S, R, FF, V, JJ.
- Label: C.D. (Center Distance).

**Unit Information:**

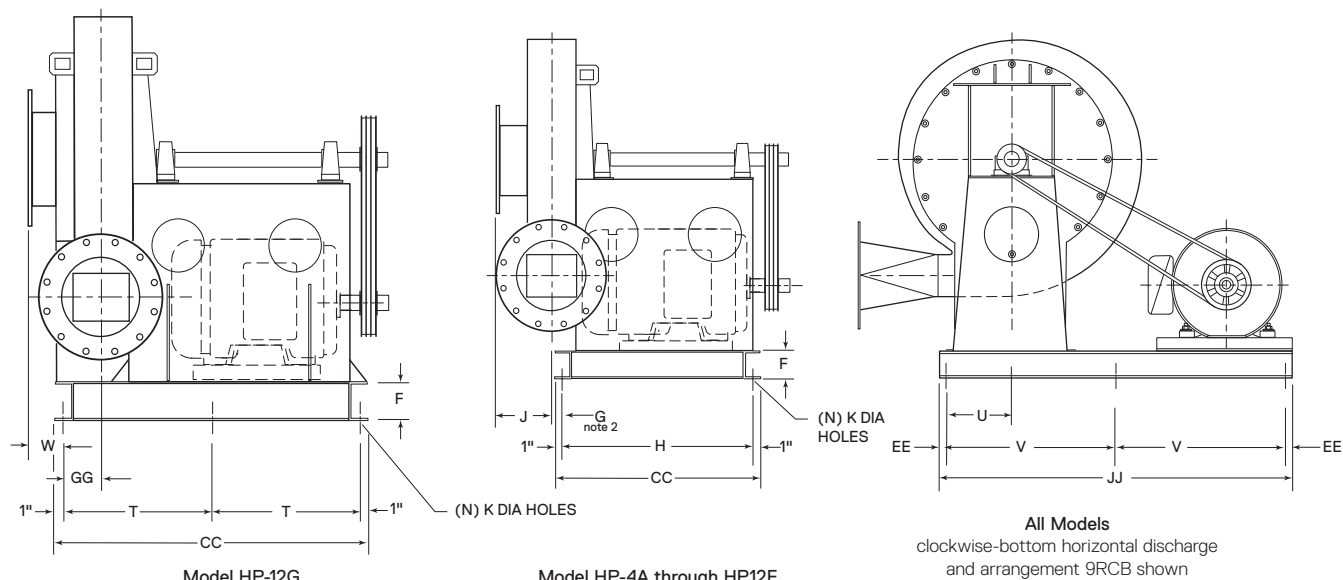
- Unit shown is Arrangement 9R (motor on right side).
- For motor on left side, specify Arrangement 9L.
- CW-BH clockwise-bottom horizontal

Model*	Motor Frame	C	F	G note 2	H	J note 2-3	K	N	V	Y	Z	BB note 2	CC note 2	FF	HH	JJ	MRL note 4
HP-4A	142T-215T	4 1/2"	4	5"	12 13/16"		4	9/16"	14 3/4"	1 7/16"	3/8"	31 5/16"		21"	18 13/16"	16 3/4"	21 1/2"
HP-4C	143T-256T	4 1/2"	5	5"	17 1/16"		4	9/16"	17"	1 7/16"	3/8"	36 9/16"		25"	23 1/16"	19"	26 1/4"
HP-6B	143T-215T	4 1/2"	4	6 3/16"	12 13/16"		4	9/16"	14 3/4"	1 7/16"	3/8"	33 1/16"		21"	18 13/16"	16 3/4"	21 1/2"
HP-6C	143T-256T	4 1/2"	5	5"	17 1/16"		4	9/16"	17"	1 7/16"	3/8"	36 9/16"		25"	23 1/16"	19"	26 1/4"
HP-6E	184T-286T	4 1/2"	5	5 11/16"	21"		4	9/16"	19"	1 7/16"	1/2"	41 7/8"		29"	27"	21"	30 1/4"
HP-8B	143T-215T	4 1/2"	4	6 3/16"	12 13/16"		4	9/16"	14 3/4"	1 7/16"	3/8"	33 11/16"		21"	18 13/16"	16 3/4"	21 1/2"
	254T-256T	4 1/2"	5	6 3/16"	17 1/16"		4	9/16"	14 3/4"	1 11/16"	3/8"	38 15/16"		21"	23 1/16"	16 3/4"	26 1/4"
HP-8D	182T-256T	4 1/2"	5	6 3/16"	17 1/16"		4	9/16"	17"	1 11/16"	3/8"	38 15/16"		25"	23 1/16"	19"	26 1/4"
HP-8E	182T-286T	4 1/2"	5	5 11/16"	21"		4	9/16"	19"	1 15/16"	1/2"	41 7/8"		29"	27"	21"	30 1/4"
HP-10D	184T-256T	4 1/2"	5	6 3/16"	17 1/16"		4	9/16"	17"	1 11/16"	3/8"	38 15/16"		25"	23 1/16"	19"	26 1/4"
HP-10F	215T-324T	4 1/2"	6	6 11/16"	21"		4	9/16"	19"	2 3/16"	1/2"	44 7/8"		29"	27"	21"	30 1/4"
HP-12F	215T-324T	4 1/2"	6	6 11/16"	21"		4	9/16"	19"	2 3/16"	1/2"	44 7/8"		29"	27"	21"	30 1/4"
HP-12G	213T-365T	6 1/2"	6	7 1/2"	26"	6"	6	3/4"	22"	2 11/16"	5/8"	53 1/2"	43 1/2"	33"	32"	24"	32 1/8"

- 1 Discharge flange not available with Downblast (DB) discharge position on models HP-8B, HP-10D, HP-12F and HP-12G.
- 2 For AMCA Type C spark resistant construction, add 1/8" to dimensions G, BB and CC.
- 3 Inlet side support plate is only included on model HP-12G.

- 4 MML is the maximum motor length (for maximum motor frame size listed) on customer supplied motor. Motor manufacturers C dimension cannot exceed MML without a special base.
- 5 Belt guard is standard on Arrangement 9 blowers. Arrangement 1 blowers do not include motor, motor slide base, belt guard, sheaves or belts.

Model	143T-145T		182T-184T		213T-215T		254T-256T		284T-286T		324T-326T		364T-365T	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
HP-4A and HP-6B	12 5/8"	10"	14 3/8"	15 7/8"	15 11/16"	17 3/8"								
HP-4C and HP-6C	13 11/16"	15"	15 7/16"	16 7/8"	16 3/4"	18 7/16"	18 3/8"	20 3/4"						
HP-6E and HP-8E			15"	16 1/2"	16 3/8"	18 3/8"	18"	20 7/16"	18 15/16"	21 15/16"				
HP-8B	11 5/8"	13 5/8"	14 3/8"	15 7/8"	15 11/16"	17 1/2"	17 3/8"	19 1/4"						
HP-8D and HP-10D			15 7/16"	16 7/8"	16 3/4"	18 7/16"	8 7/16"	20 3/4"						
HP-10F and HP-12F					16 3/8"	18 3/8"	18"	20 7/16"	18 15/16"	21 15/16"	19 5/8"	23 1/4"		
HP-12G					19 3/4"	21"	21 1/2"	23"	22 1/8"	24 3/8"	24 3/8"	26 3/4"	25 3/4"	27 1/2"

**ARRANGEMENT 9RCB OR 9LCB CHANNEL BASE — BELT DRIVE**

**Note**—For common boxed blower housing dimensions, see page 14

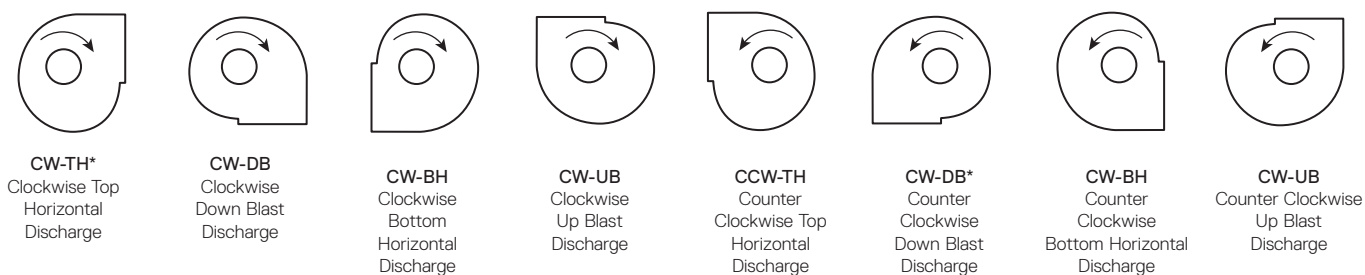
Model*	Motor Frame	F	G note 1	H	J	K	N	T	U	V	W	CC	EE	GG	JJ
HP-4A	182T-215T	4"	3"	16 <sup>13</sup> / <sub>16</sub> "	6 1/2"	9/16"	6		7 3/8"	21 1/2"		18 <sup>13</sup> / <sub>16</sub> "	1"		45"
HP-4C	182T-256T	4"	3"	21 <sup>1</sup> / <sub>16</sub> "	6 1/2"	9/16"	6		8 1/2"	22 1/2"		23 <sup>1</sup> / <sub>16</sub> "	1"		47"
HP-6B	182T-215T	4"	4 <sup>3</sup> / <sub>16</sub> "	16 <sup>13</sup> / <sub>16</sub> "	7 1/16"	9/16"	6		7 3/8"	21 1/2"		18 <sup>13</sup> / <sub>16</sub> "	1"		45"
HP-6C	213T-256T	4"	3"	21 <sup>1</sup> / <sub>16</sub> "	6 1/2"	9/16"	6		8 1/2"	22 1/2"		23 <sup>1</sup> / <sub>16</sub> "	1"		47"
HP-6E	213T-286T	4"	1 <sup>3</sup> / <sub>16</sub> "	30"	7 1/16"	9/16"	6		9 1/2"	25 1/2"		32"	1"		53"
HP-8B	213T-256T	4"	4 <sup>3</sup> / <sub>16</sub> "	21 <sup>1</sup> / <sub>16</sub> "	7 1/16"	9/16"	6		7 3/8"	21 1/2"		23 <sup>1</sup> / <sub>16</sub> "	1"		45"
HP-8D	213T-286T	4"	4 <sup>3</sup> / <sub>16</sub> "	21 <sup>1</sup> / <sub>16</sub> "	7 1/16"	9/16"	6		8 1/2"	22 1/2"		23 <sup>1</sup> / <sub>16</sub> "	1"		47"
HP-8E	213T-326T	4"	1 <sup>3</sup> / <sub>16</sub> "	30"	7 3/16"	9/16"	6		9 1/2"	25 1/2"		32"	1"		53"
HP-10D	213T-326T	4"	4 <sup>3</sup> / <sub>16</sub> "	21 <sup>1</sup> / <sub>16</sub> "	7 1/16"	9/16"	6		8 1/2"	22 1/2"		23 <sup>1</sup> / <sub>16</sub> "	1"		47"
HP-10F	213T-364T	4"	2 <sup>3</sup> / <sub>16</sub> "	30"	8 <sup>3</sup> / <sub>16</sub> "	9/16"	6		9 1/2"	25 1/2"		32"	1"		53"
HP-12F	213T-364T	4"	2 <sup>3</sup> / <sub>16</sub> "	30"	8 <sup>3</sup> / <sub>16</sub> "	9/16"	6		9 1/2"	25 1/2"		32"	1"		53"
HP-12G	284T-444T	6"				3/4"	8	22 1/2"	7"	28 <sup>3</sup> / <sub>16</sub> "	5	47"	5"	6"	66 <sup>3</sup> / <sub>8</sub> "

\*Complete model number includes wheel diameter

2 For AMCA Type C spark resistant construction, add 1/4" to dimension D.

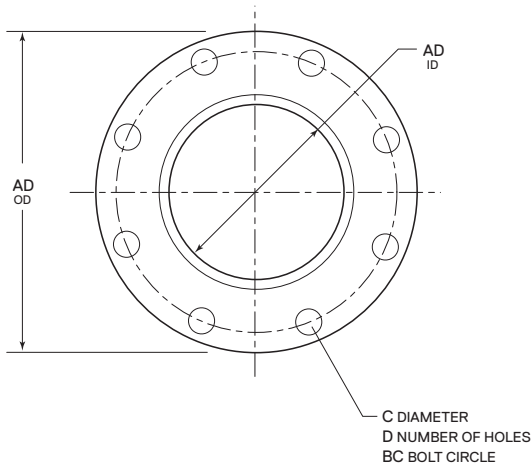
**Sixteen Discharge Positions Available. 45° Discharge Positions Not shown**

Discharges shown are determined by viewing fan from motor or drive side

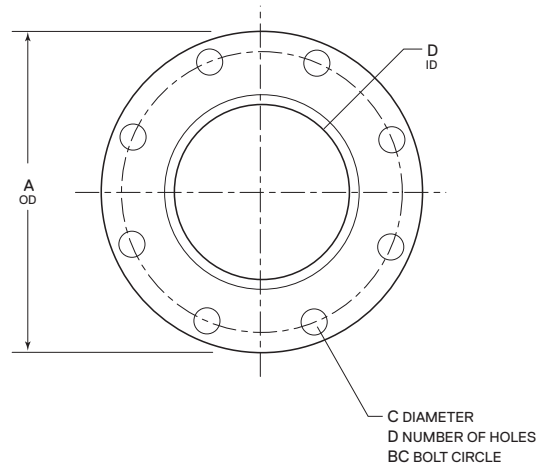


\*Discharge flange not available with downblast discharge on models HP-8B, HP-10D, HP-12F and HP-12G.

## INLET AND DISCHARGE FLANGES



Inlet Flange



Discharge Flange

Model	AA	AD	BC	C	D
HP-4A HP-4C and HP-6C	6"	11"	9 1/2"	7/8"	8
HP-6B HP-6E HP-8B HP-8D HP-8E and HP-10D	8"	13 1/2"	11 3/4"	7/8"	8
HP-10F and HP-12F	10"	16"	14 1/4"	1"	12
HP-12G	14"	21"	18 3/4"	1 1/8"	12

All dimensions except flange thickness meet ANSI-125 lb and ASA-150 lb specifications. Standard orientation is holes straddling major center lines. Holes may be specified to be on center lines at no additional cost.

Model	DD	A	BC	C	D
HP-4A and HP-4C	4"	9"	7 1/2"	3/4"	8
HP-6B HP-6C and HP-6E	6"	11"	9 1/2"	7/8"	8
HP-8B HP-8D and HP-8E*	8"	13 1/2"	11 3/4"	7/8"	8
HP-10D and HP-10F*	10"	16"	14 1/4"	1"	12
HP-12F and HP-12G*	12"	19"	17"	1"	12

\*See note under discharge positions available on page 18

## APPROXIMATE SHIPPING WEIGHT LESS MOTOR

Model	Motor Frame	Fan Arrangement			
		4	8	1 and 9	9CB
HP-4A	143T-184T	190	265		
	143T-215T			220	
	182T-213T				315
HP-4C	143T-215T	250	335		
	254T	260	350		
	143T-256T			280	
	182T-254T			—	380
HP-6B	143T-184T	210	285		
	213T-215T	240	315		
	143T-215T			270	
	182T-215T				365
HP-6C	143T-2156T	270	355		
	254T	300	385		
	143T-256T			310	
	213T-256TS				410
HP-6E	184T-256T	350	445		
	184T-286T			400	
	213T-286T			—	510
HP-8B	143T-184T	215			
	213T-254T	245			
	143T-215T		290	275	
	254T-256T		320	300	
	213T-2566T				395
HP-8D	182T-215T	280	365		
	254T-286TS	300			
	254T-256T		385		
	184T-256T			340	
	213T-286T				440

Model	Motor Frame	Fan Arrangement			
		4	8	1 and 9	9CB
HP-8E	213T - 256T	360	455		
	284T - 324T	380			
	284TS - 326TS		475		
	182T - 286T			430	
HP-10D	213T - 326T				540
	184T - 215T	290	375		
	184T - 256T			350	
	254T - 286TS	310	395	370	
HP-10F	213T - 326T				470
	215T - 256T	380	475		
	284TS - 326TS	395	490		
	215T - 324T			445	
HP-12F	213T - 364T				565
	184T - 256T	380			
	215T - 256T		475		
	284TS - 364TS	400	495		
HP-12G	215T - 324T			465	
	213T - 364T				595
	254T - 256T	712			
	284T - 326T	766			
HP-12G	364T - 365T	787			
	404T - 405T	802			
	444TS	856			
	213T - 365T			1080	
HP-12G	284T - 444T				1400

**SPX ENGINEERED AIR MOVEMENT**

7697 SNIDER ROAD  
MASON, OH 45040 USA  
513 573 1000 | [spxairmovement.com](https://spxairmovement.com)

CF-CPF-TECH-24 | ISSUED 3/2024

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In the interest of technological progress, all products are subject to design and/or material change without notice.

**SPX**   
**TECHNOLOGIES**





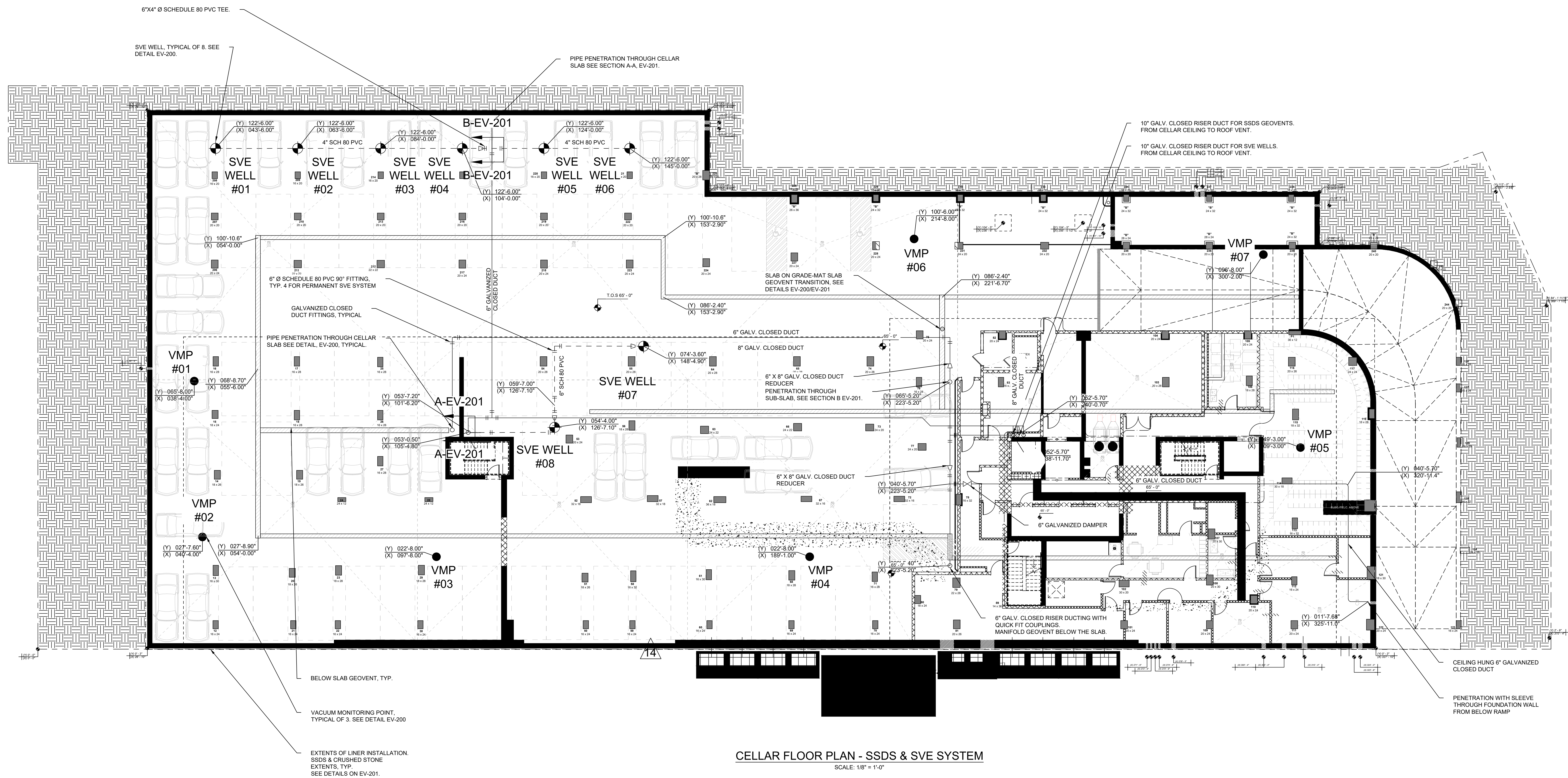


## APPENDIX O-C

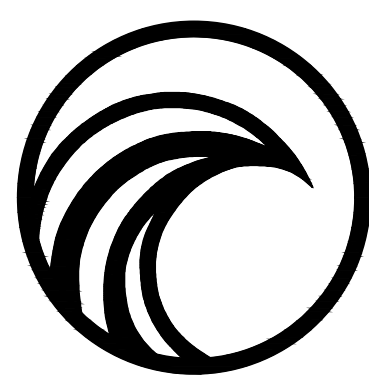
### SSDS and SVE System INSPECTION LOG







Legend	
	SUB-SLAB SOLID PIPING
	ABOVE-SLAB CLOSED DUCTING
	EXTENTS OF GRAVEL LAYER
	GEOVENT
	VACUUM MONITORING POINT
	SVE WELL
	REDUCER
	DAMPER
	SLAB PENETRATION
	90 DEGREE FITTING
	TEE FITTING



**PWGC**  
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E-mail: [INFO@PWGROSSER.COM](mailto:INFO@PWGROSSER.COM)

CONSULTANTS

7		
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4	AS-BUILTS	11/14/2024
3	DEC REVIEW	05/30/2023
2	FOUNDATION BID SET REVISIONS	11/18/2022
1	100% DESIGN DEVELOPMENT	10/01/2022


DESIGNED BY	MTS	DATE SUBMITTED	11/14/2024
DRAWN BY	AP	DATE LOCKED	10/01/2022
CHECKED BY	JL	DATE NOTED	AS NOTED

1065 ATLANTIC AVENUE, LLC  
7 PENN PLAZA, SUITE 600  
NEW YORK, NY 10001

SSDS AND SVE AS-BUILTS

1045-1065 ATLANTIC AVENUE  
BROOKLYN, NY 11238

**SSDS AND SVE  
SYSTEM AS-BUILTS**

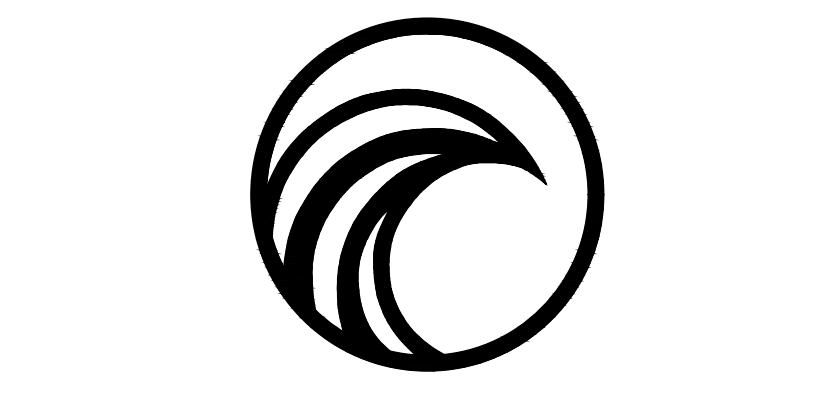


**EV-100**

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TOT1903

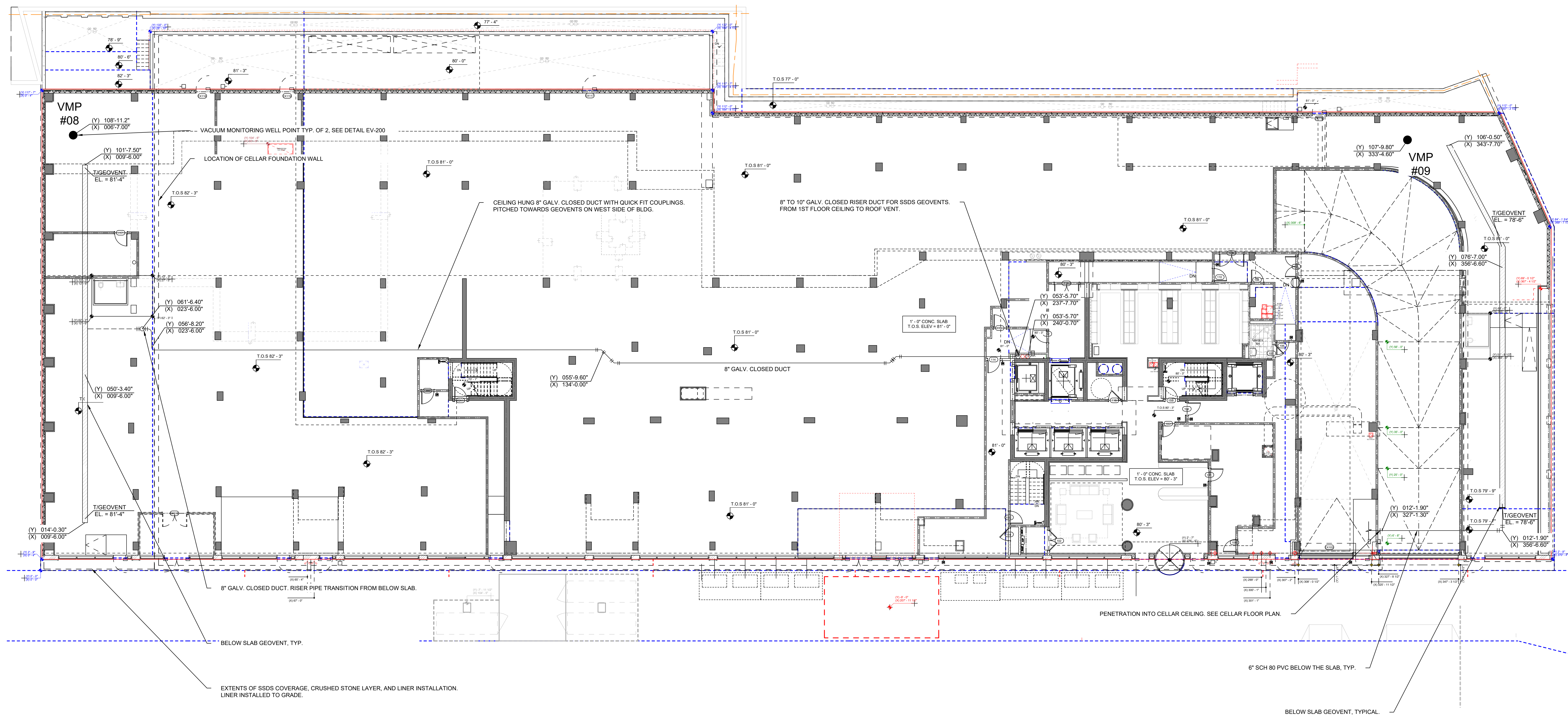




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CONSULTANTS



FIRST FLOOR PLAN - SSDS & SVE SYSTEM  
SCALE: 1/8" = 1'-0"

7		
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4	AS-BUILTS	11/14/2024
3	DEC REVIEW	08/30/2023
2	FOUNDATION BID SET REVISIONS	11/15/2022
1	100% DESIGN DEVELOPMENT	10/01/2022

Designed By	MTS	Date Submitted	11/14/2024
Reviewed By	AP	Date Checked	10/01/2023
Approved By	JL	Date	AS NOTED

1065 ATLANTIC AVENUE, LLC  
7 PENN PLAZA, SUITE 600  
NEW YORK, NY 10001

SSDS AND SVE AS-BUILTS

1045-1057 ATLANTIC AVE  
BROOKLYN, NY 11238

SSDS AND SVE  
SYSTEM AS-BUILTS



EV-101

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CONSULTANTS

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4	AS-BUILTS	11/14/2024
3	DEC REVIEW	05/30/2023
2	FOUNDATION BID SET REVISIONS	11/18/2022
1	100% DESIGN DEVELOPMENT	10/01/2022
Revised By: MTS Date Submitted: 11/14/2024		
Revised By: AP Date Submitted: 10/01/2022		
Revised By: JL Date Submitted: AS NOTED		

1065 ATLANTIC AVENUE, LLC  
7 PENN PLAZA, SUITE 600  
NEW YORK, NY 10001

SSDS AND SVE AS-BUILTS

1041-1065 ATLANTIC AVE  
BROOKLYN, NY 11238

SSDS AND SVE  
SYSTEM AS-BUILTS

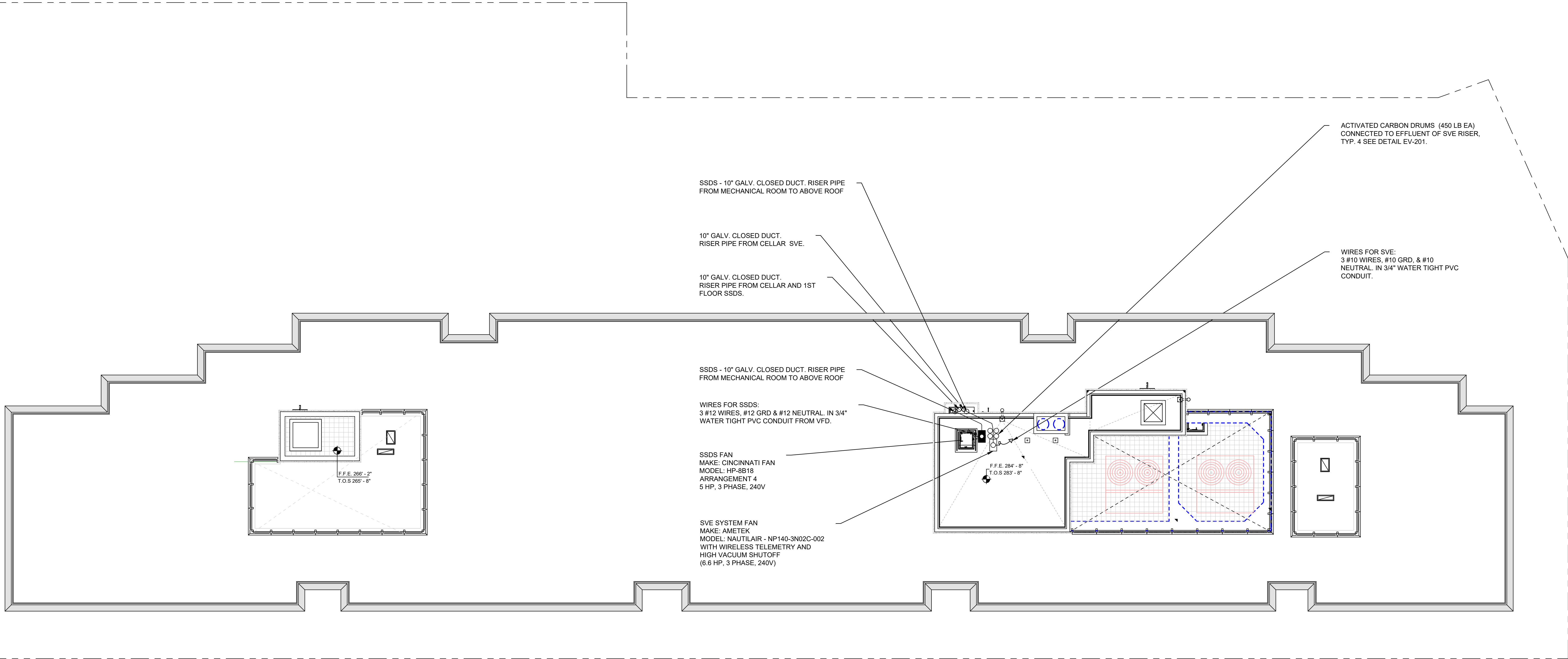


EV-102

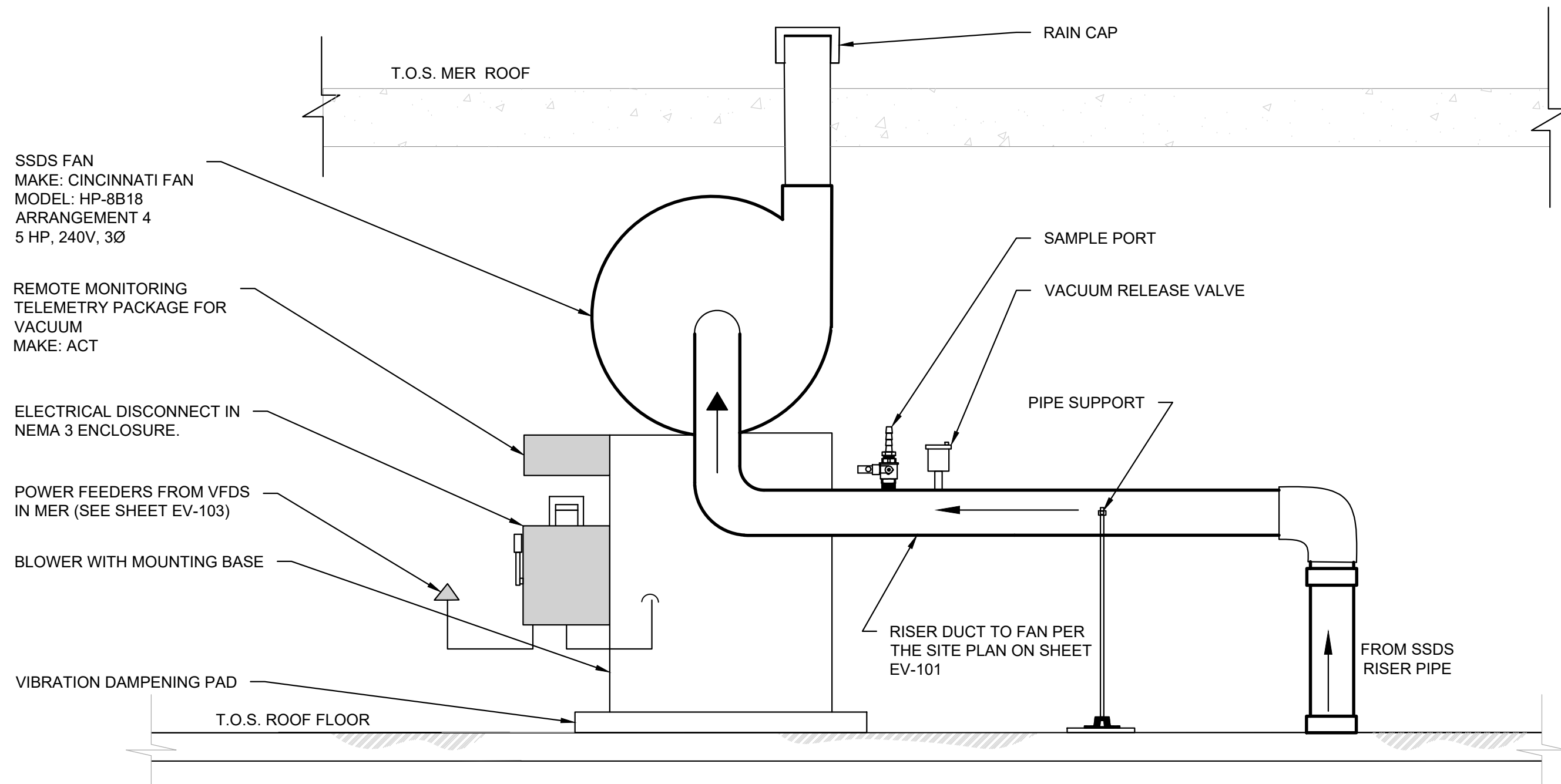
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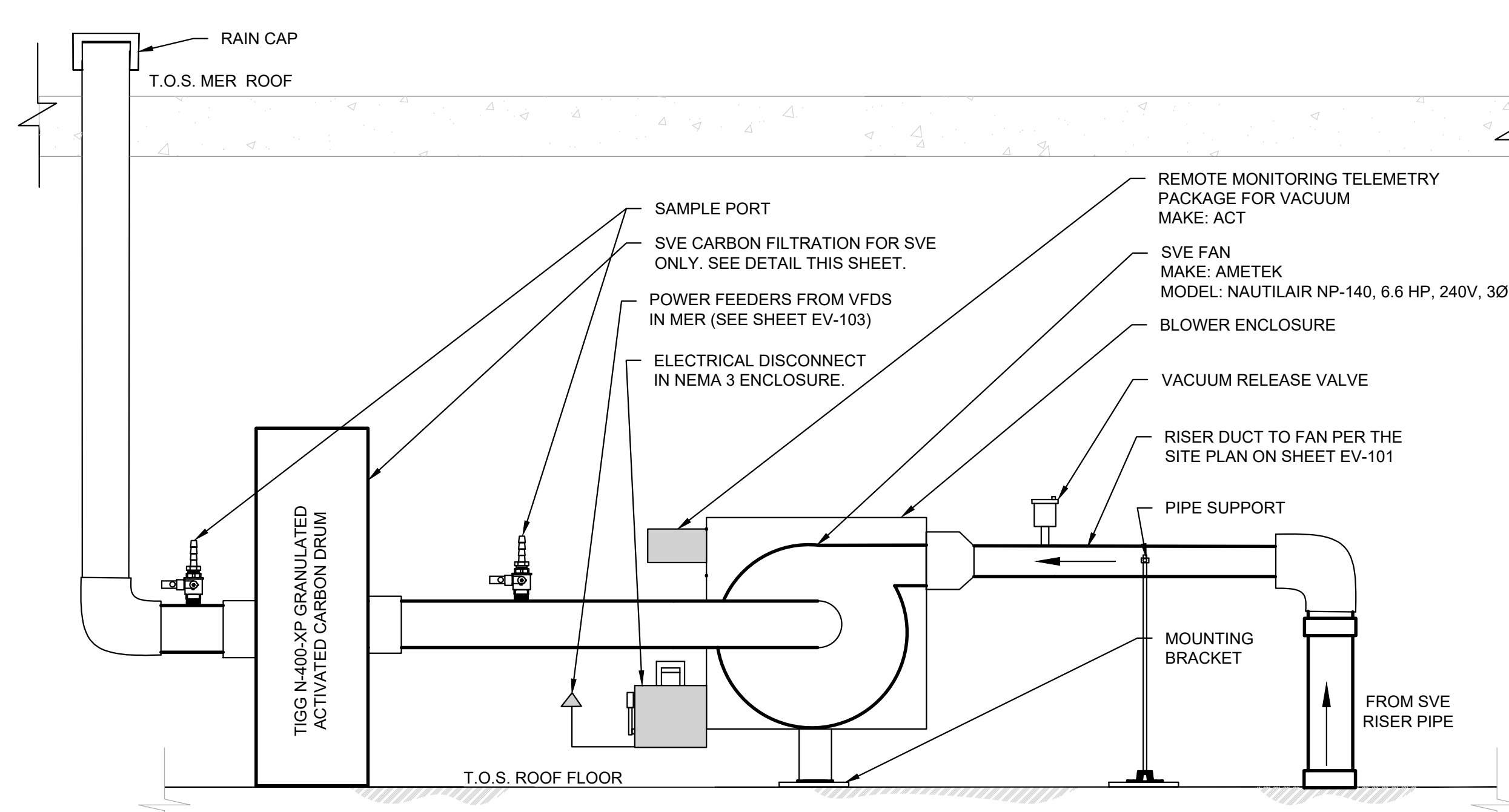
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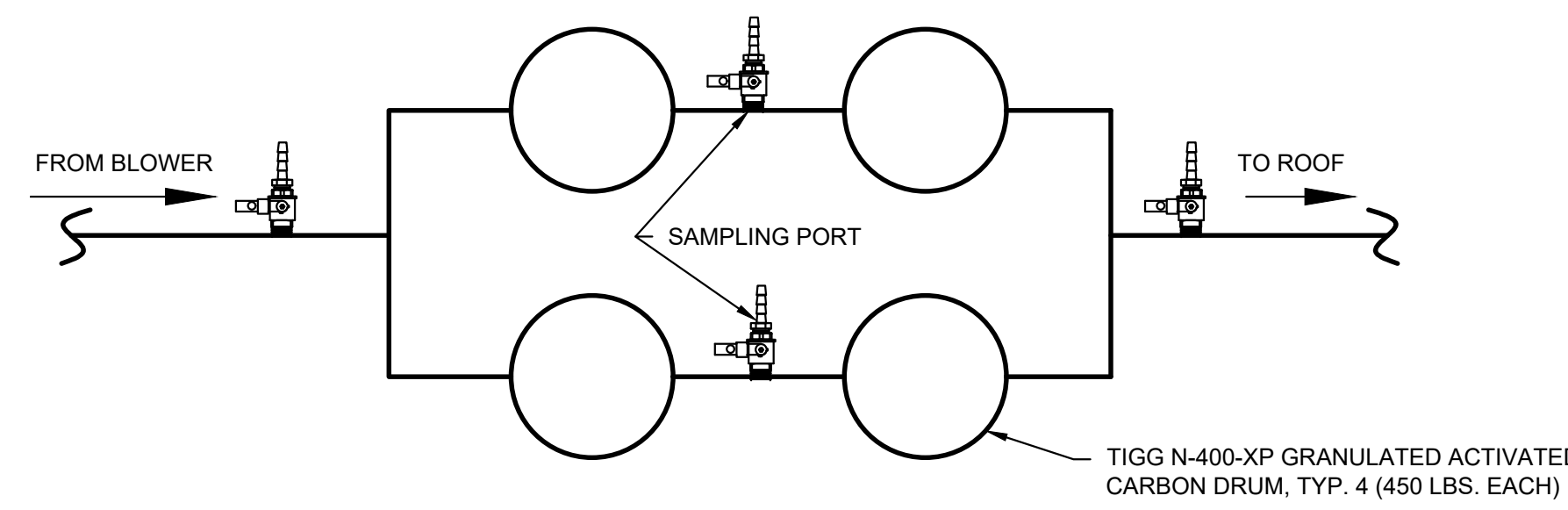
ROOF PLAN - SSDS & SVE SYSTEM  
SCALE: 1/8" = 1'-0"



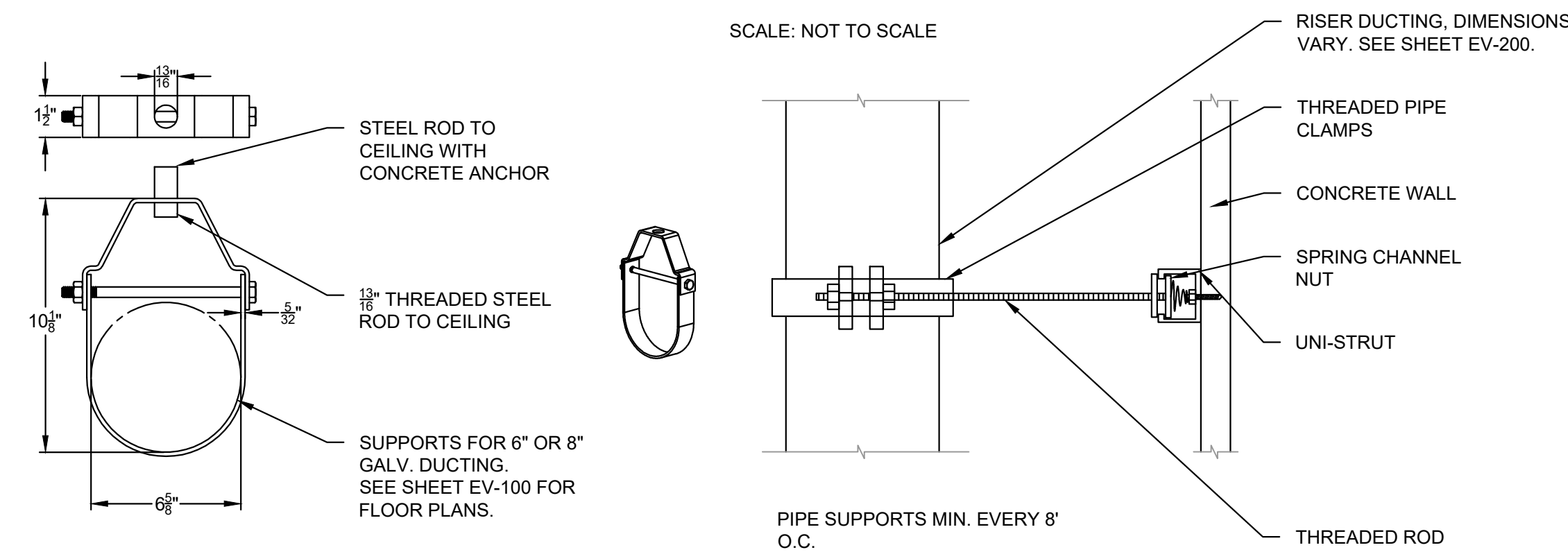
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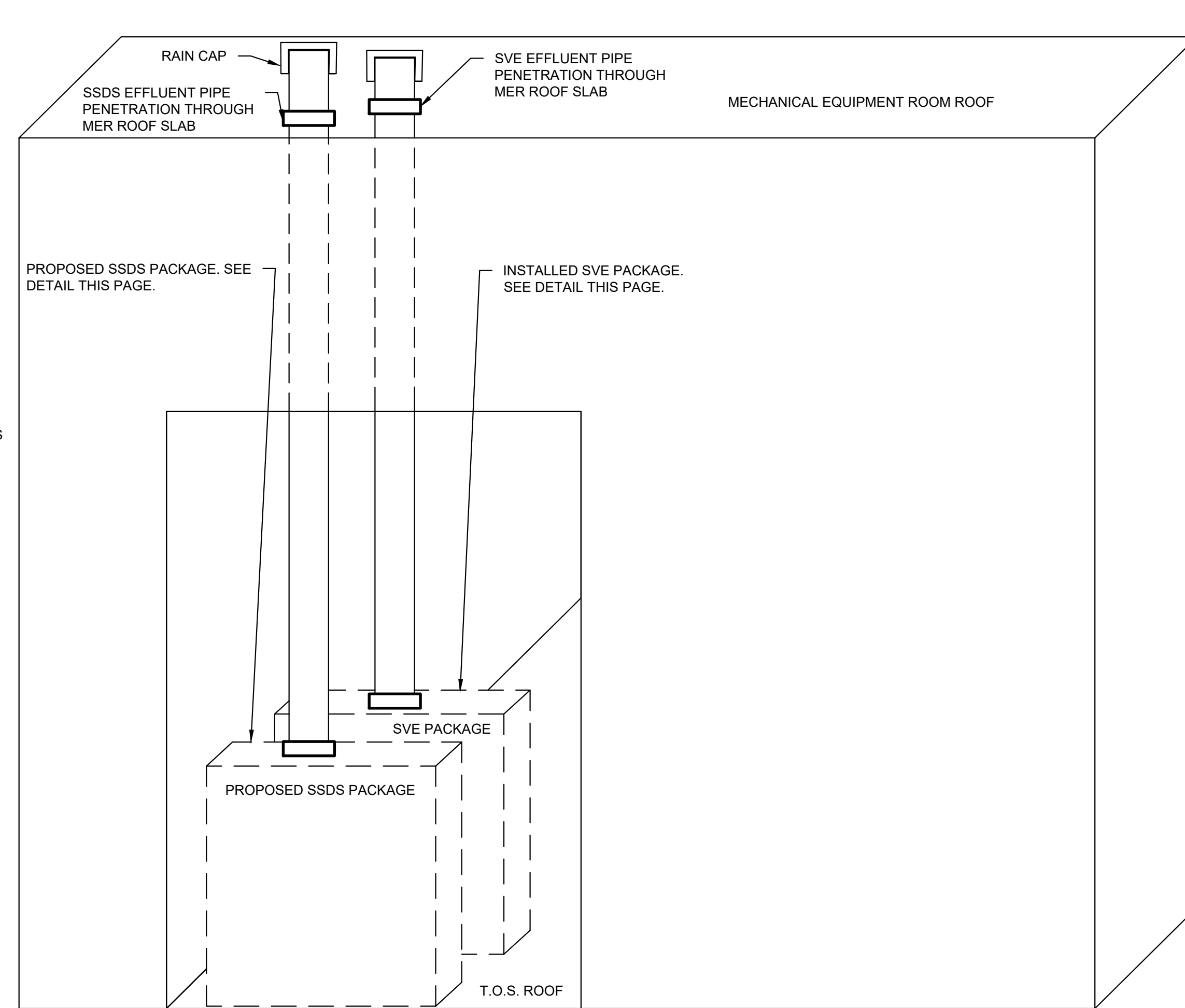
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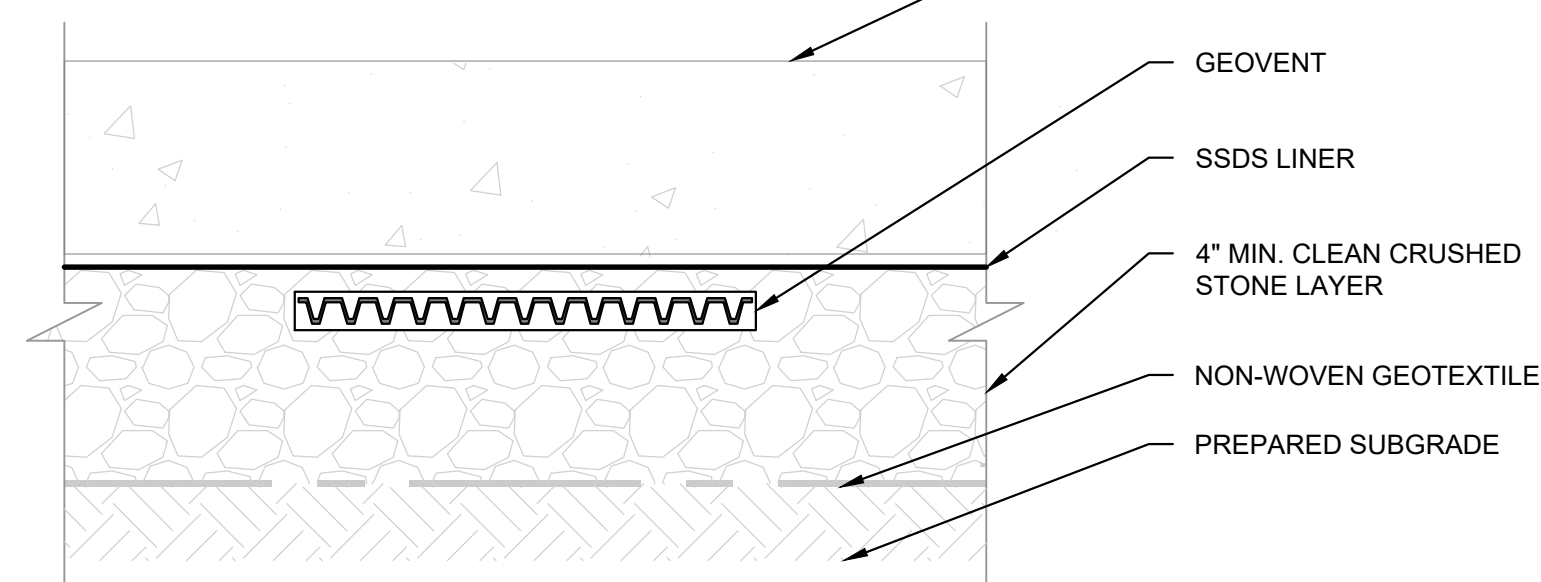
**SVE CARBON FILTRATION DETAIL**



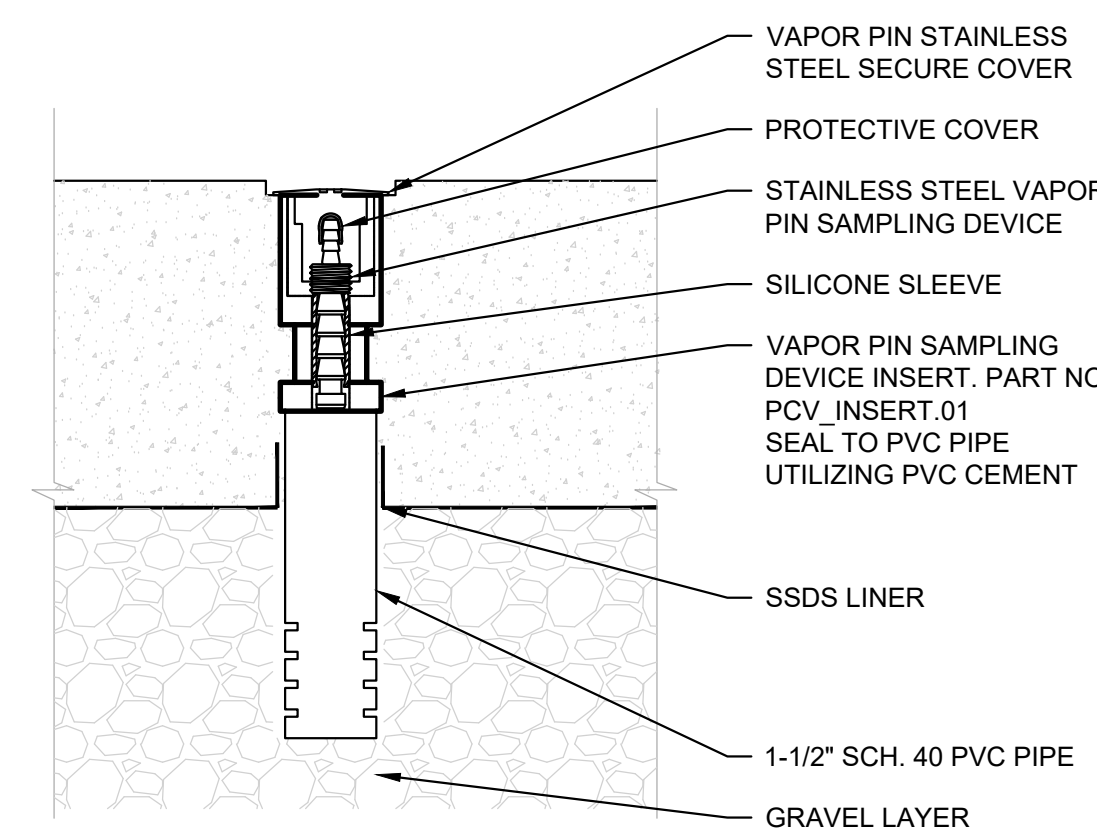
**DUCT HANGER SUPPORT DETAILS**  
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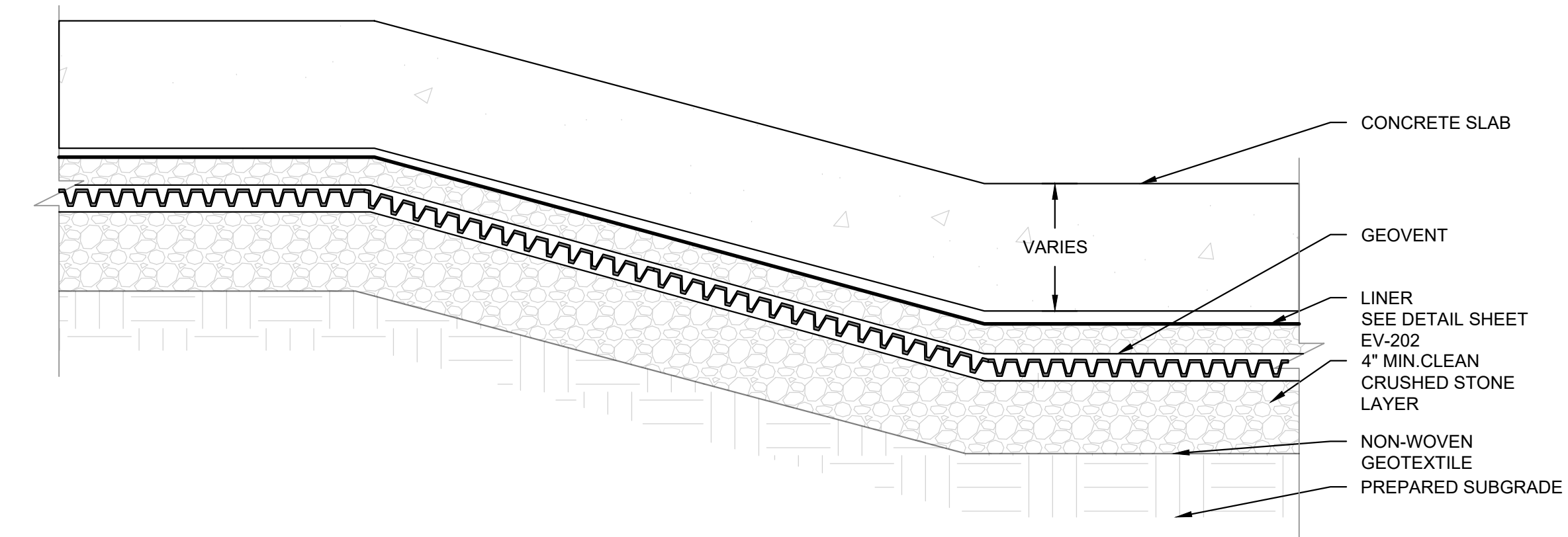
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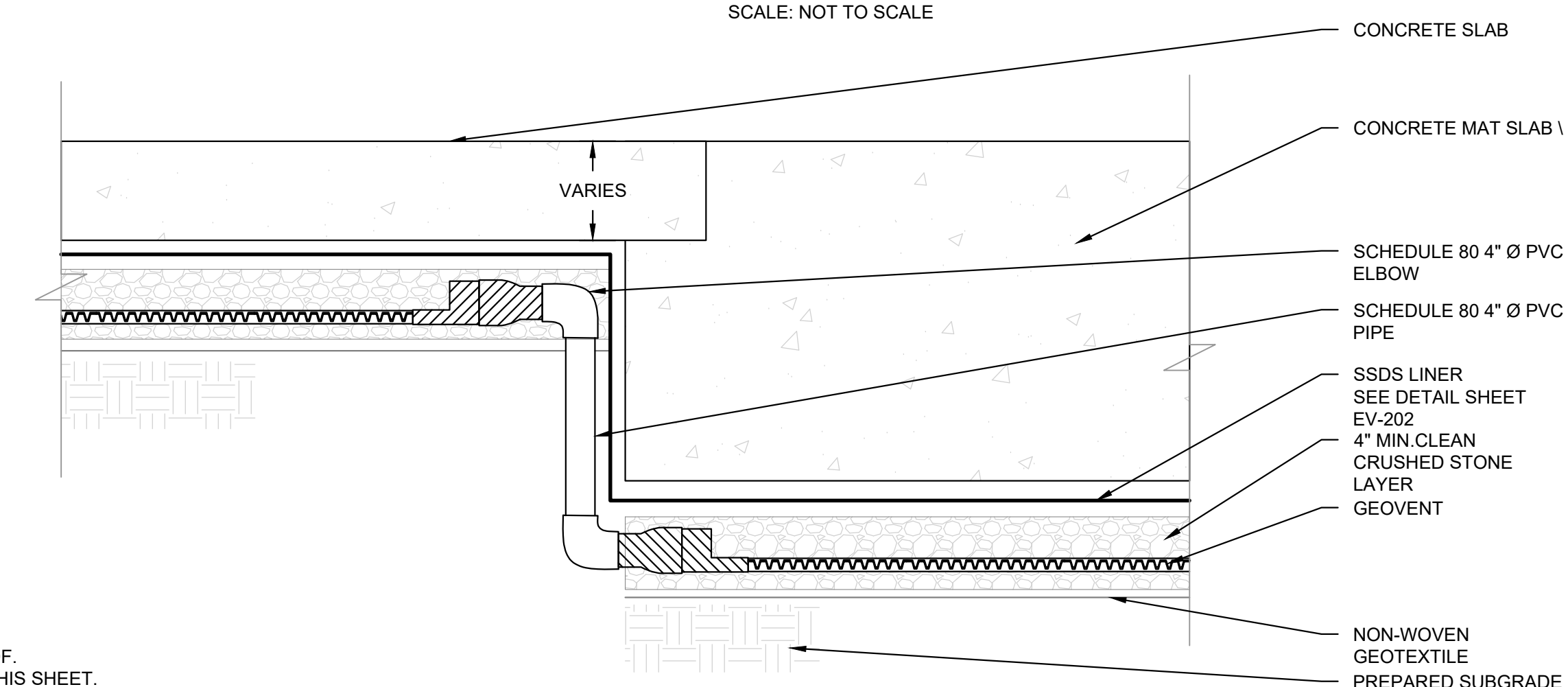
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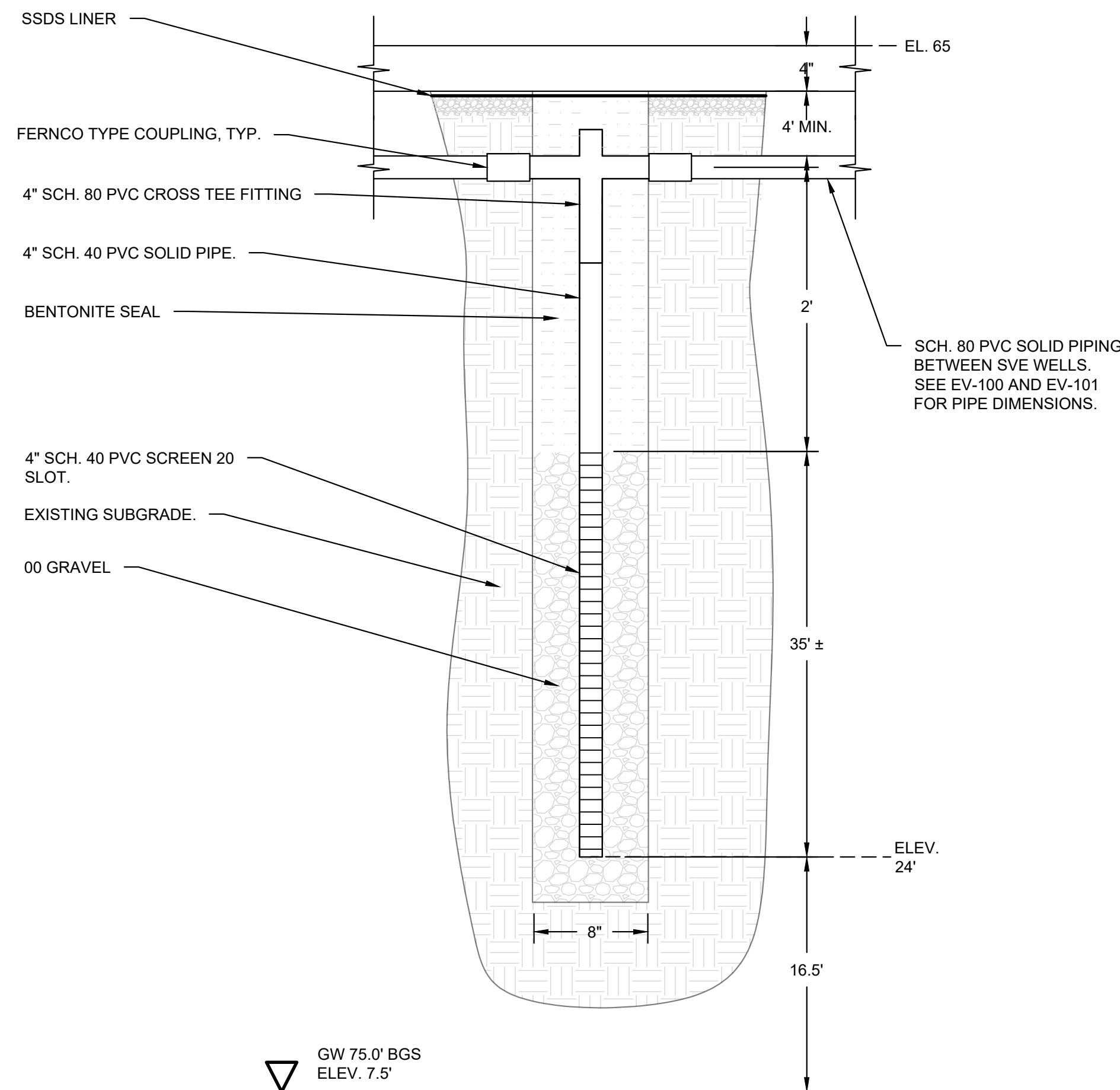
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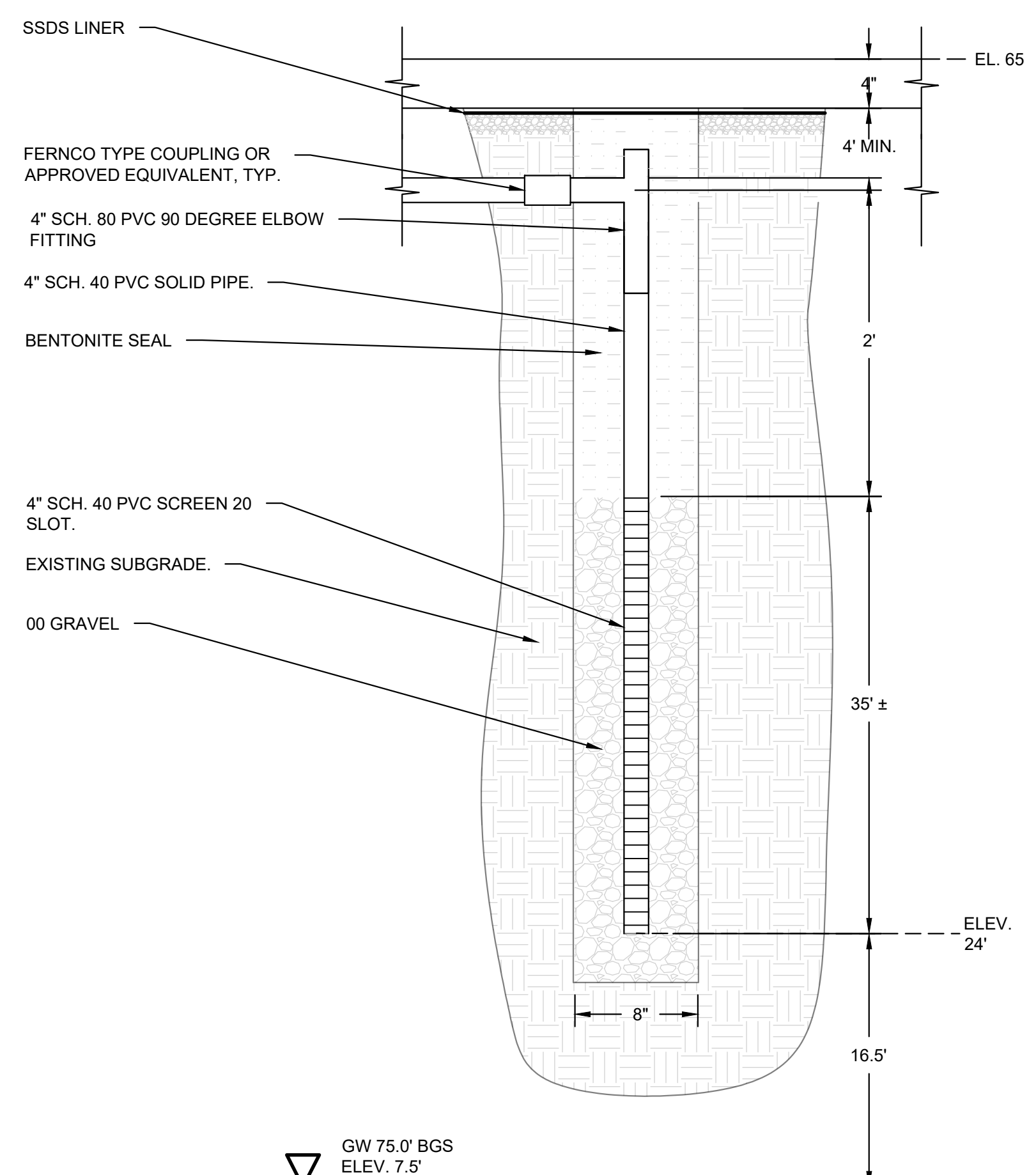
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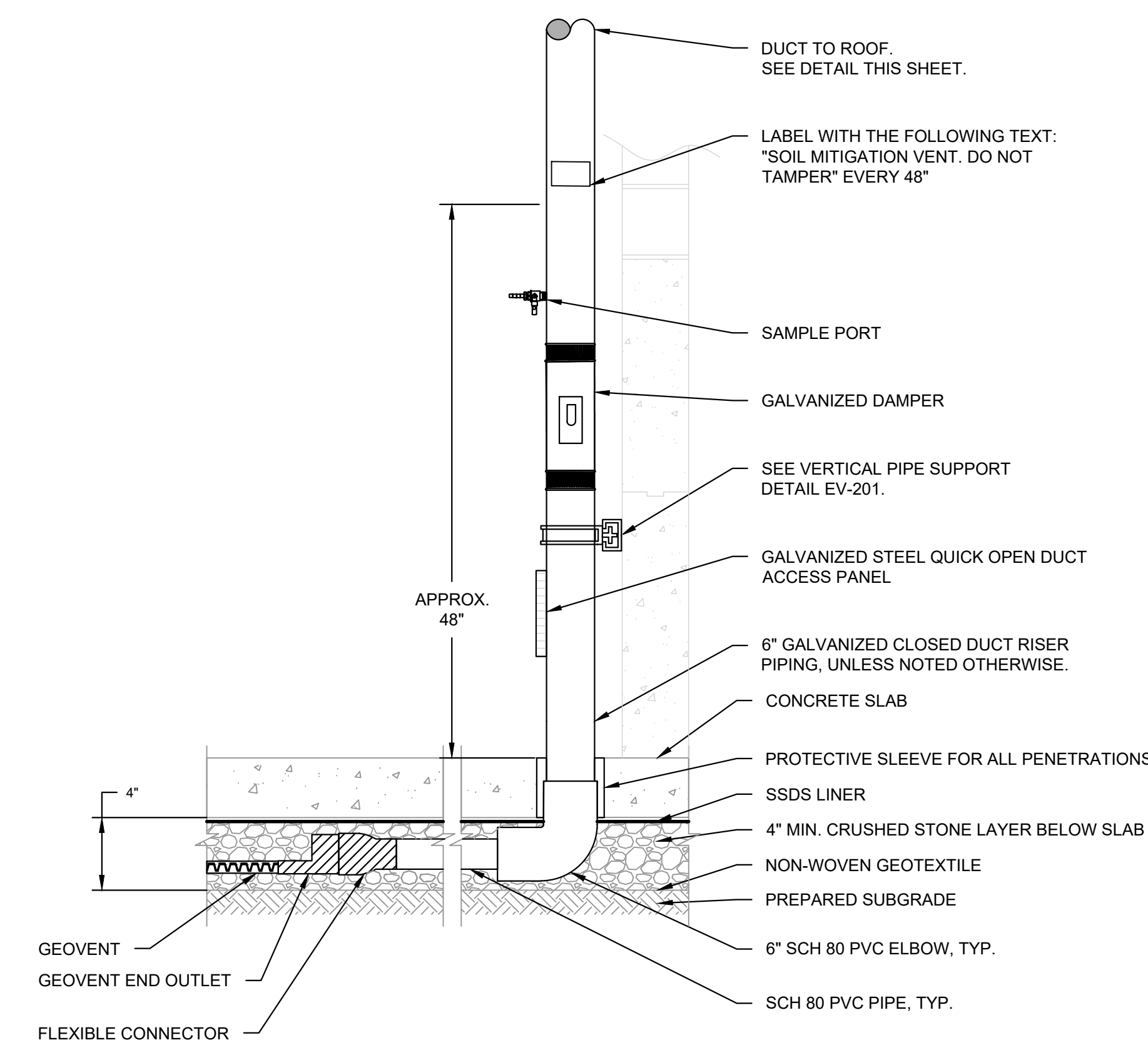
**GEOVENT SLAB ON GRADE-MAT SLAB TRANSITION DETAIL**  
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**SVE WELL 8 - INTERIOR OF BUILDING - DETAIL**  
SCALE: NOT TO SCALE



**SVE WELL 7 - INTERIOR OF BUILDING - DETAIL**  
SCALE: NOT TO SCALE



**TYPICAL SUB-SLAB PENETRATION DETAIL**  
SCALE: NOT TO SCALE

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**CONSULTANTS**

7		
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4	AS-BUILTS	11/14/2024
3	DEG REVIEW	05/30/2023
2	FOUNDATION BID SET REVISIONS	11/15/2022
1	100% DESIGN DEVELOPMENT	10/01/2022
Prepared By: <b>MTS</b> Date Submitted: <b>11/14/2024</b> Checked By: <b>AP</b> Date Checked: <b>10/01/2022</b> Approved By: <b>JL</b> Date: <b>AS NOTED</b>		

**1065 ATLANTIC AVENUE, LLC**  
**7 PENN PLAZA, SUITE 600**  
**NEW YORK, NY 10001**

**SSDS AND SVE AS-BUILTS**

**1045-1065 ATLANTIC AVE**  
**BROOKLYN, NY 11238**

**SSDS AND SVE**  
**SYSTEM AS-BUILTS**



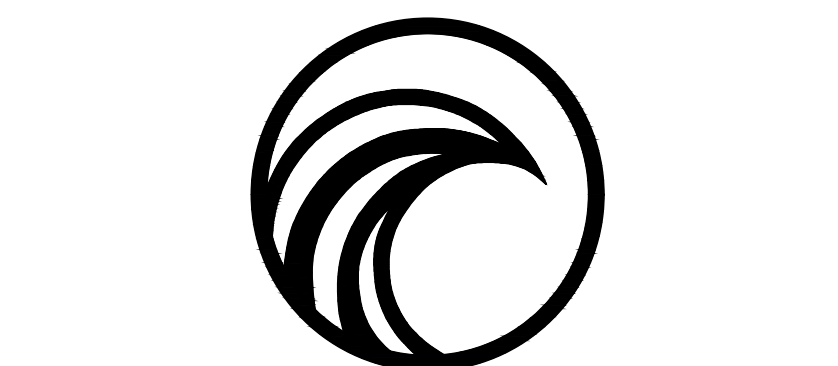
**EV-200**

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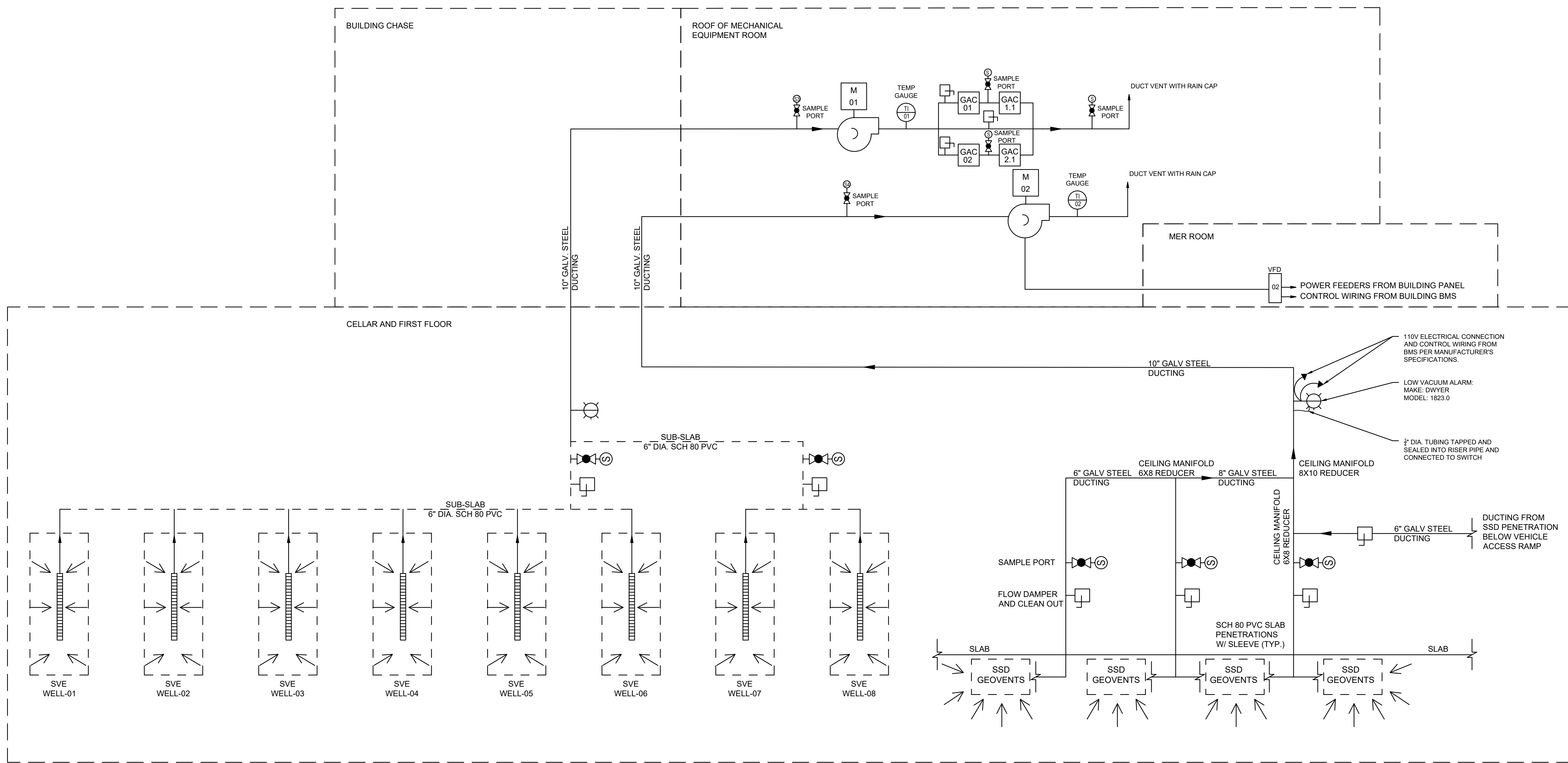
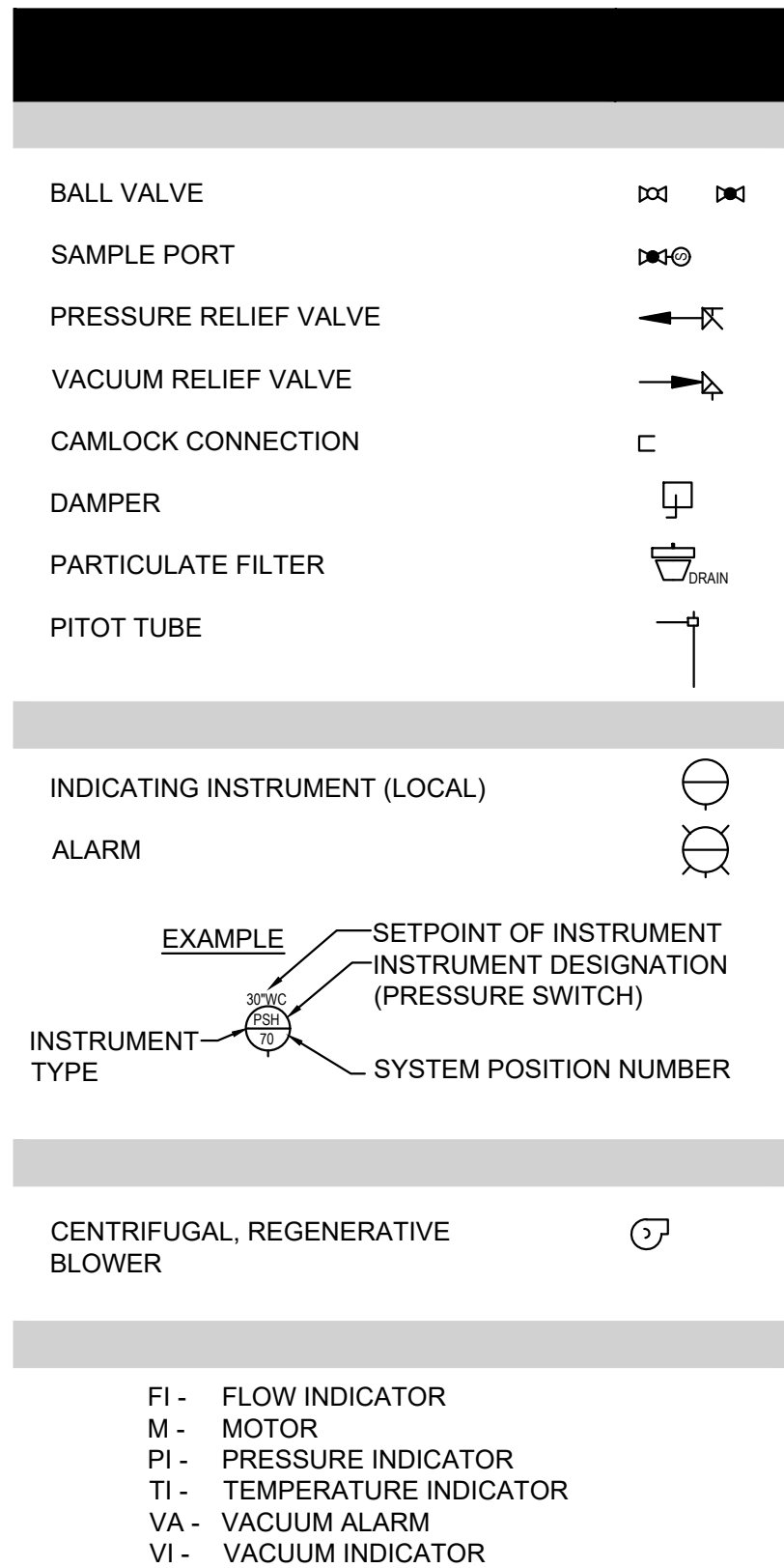
TOT1903



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**Default I/O connections**  
This is the default configuration of control connections for HVAC applications.

**Default control connections for the HVAC default**

0...10 V DC speed reference signal	<b>X1</b>	Reference voltage and analog inputs and outputs
	1	SCR Signal cable shield (screen)
	2	AI1 Output frequency/speed reference: 0 to 10 V
	3	AGND Analog input circuit common
	4	+10V Reference voltage 10VDC
	5	AI2 Actual feedback: 0 to 20 mA
	6	AGND Analog input circuit common
	7	AO1 Output frequency: 0 to 10V
	8	AO2 Output current: 0 to 20mA
	9	AGND Analog output circuit common
Start/Stop signal	<b>X2 &amp; X3</b>	Aux. voltage output and programmable digital inputs
	10	+24V Aux. voltage output +24VDC, max. 250mA
	11	DGND Aux. voltage output common
	12	DCOM Digital input common for all
	13	DI1 Stop (0)/Start (1)
	14	DI2 Not configured
	15	DI3 Constant frequency/speed selection
	16	DI4 Start interlock 1 (1 = allow start)
	17	DI5 Not configured
Safety	18	DI6 Not configured
	<b>X6, X7, X8 Relay outputs</b>	
	19	RO1C Damper control 250 V AC / 30 V DC 2 A
	20	RO1A Energize damper 19 connected to 21
	21	RO1B Running 250 V AC / 30 V DC 2 A
	22	RO2C Running 22 connected to 24
	23	RO2A Fault (-1) 250 V AC / 30 V DC 2 A
	24	RO2B Fault condition 25 connected to 26
	25	RO3C
Run status	26	RO3A
	27	RO3B
	<b>X5 Embedded fieldbus</b>	
	29	B+ Embedded fieldbus, EFB (EIA-485)
	30	A- Embedded fieldbus, EFB (EIA-485)
	31	DGND Termination switch
	S4	TERM Bias resistors switch
	S5	BIAS
	<b>X4 Safe torque off</b>	
Fault status	34	OUT1 Safe torque off
	35	OUT2
	36	SGND
	37	IN1
	38	IN2
	<b>X10 24 V AC/DC</b>	
	40	24V AC/DC+ in Ext. 24V AC/DC input to power up the control unit when the main supply is disconnected.
	41	24V AC/DC- in

X10 (24 V AC/DC) applicable to ACH580-01 R6-R9 and ACH580-31/34 only.

**VARIABLE FREQUENCY DRIVE (VFD) WIRING DIAGRAM**

1065 ATLANTIC AVENUE, LLC  
7 PENN PLAZA, SUITE 600  
NEW YORK, NY 10001

**SSDS AND SVE AS-BUILTS**

1045-1065 ATLANTIC AVE  
BROOKLYN, NY 11238

**SSDS AND SVE  
SYSTEM AS-BUILTS**



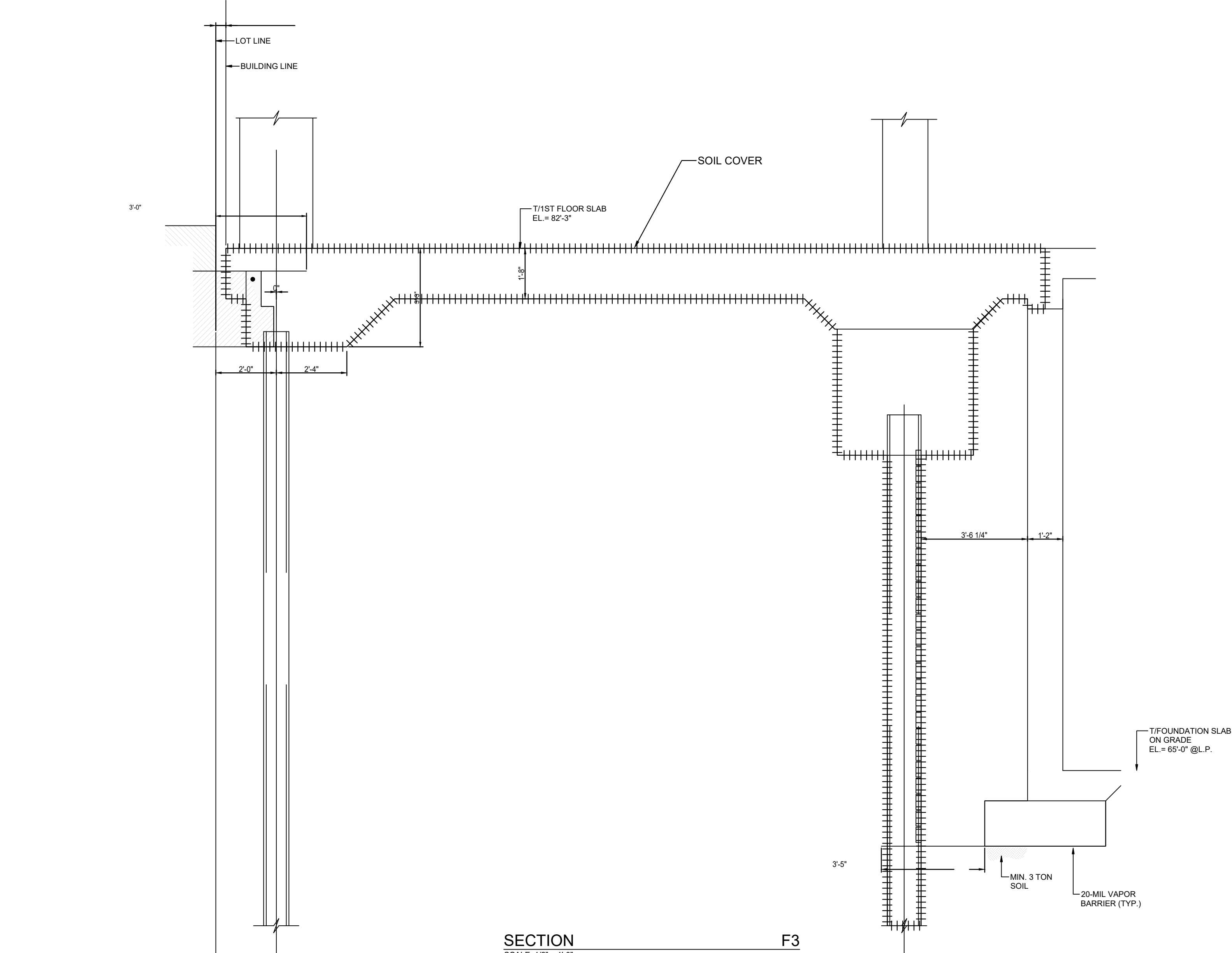
**EV-300**

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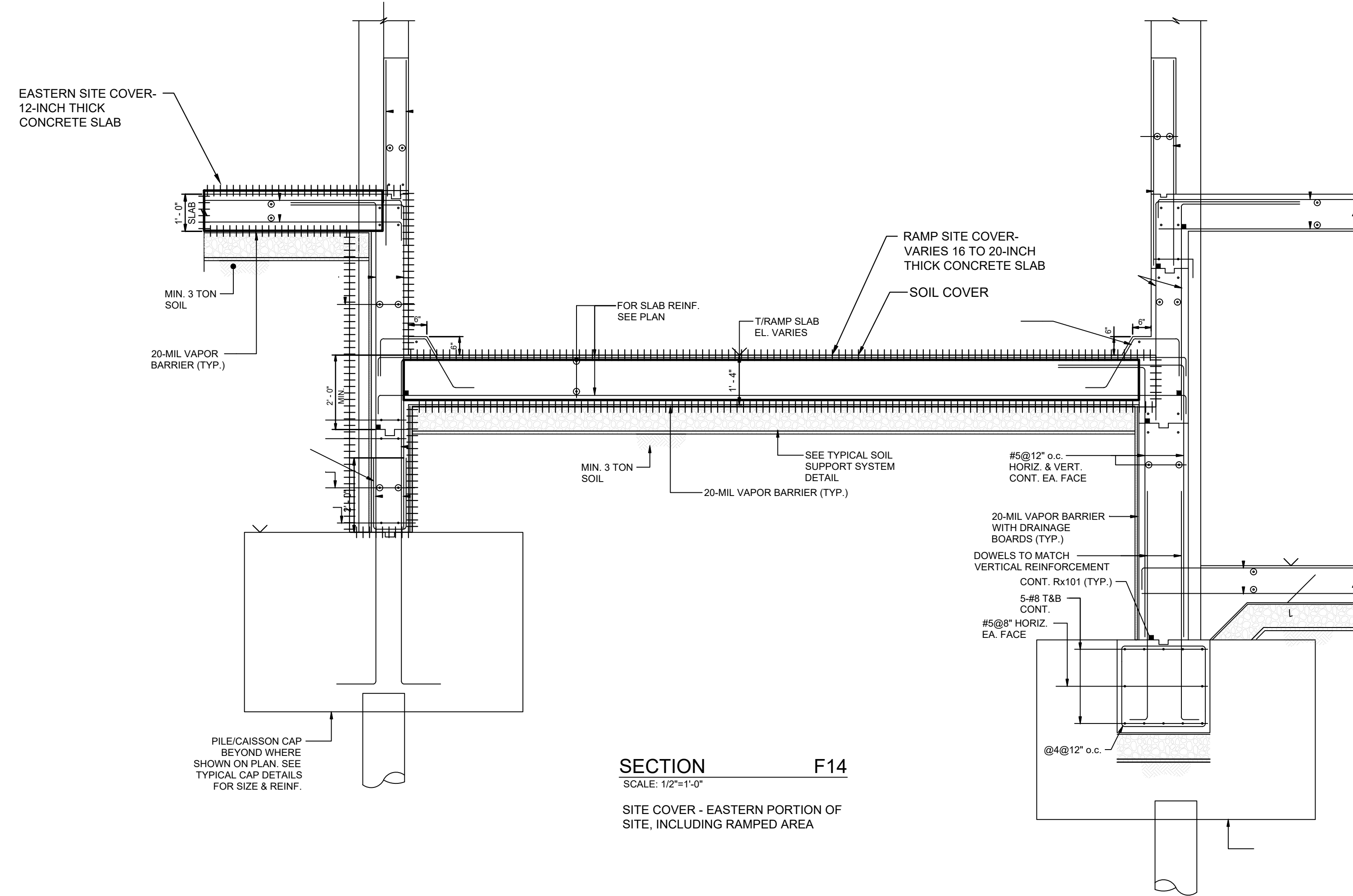
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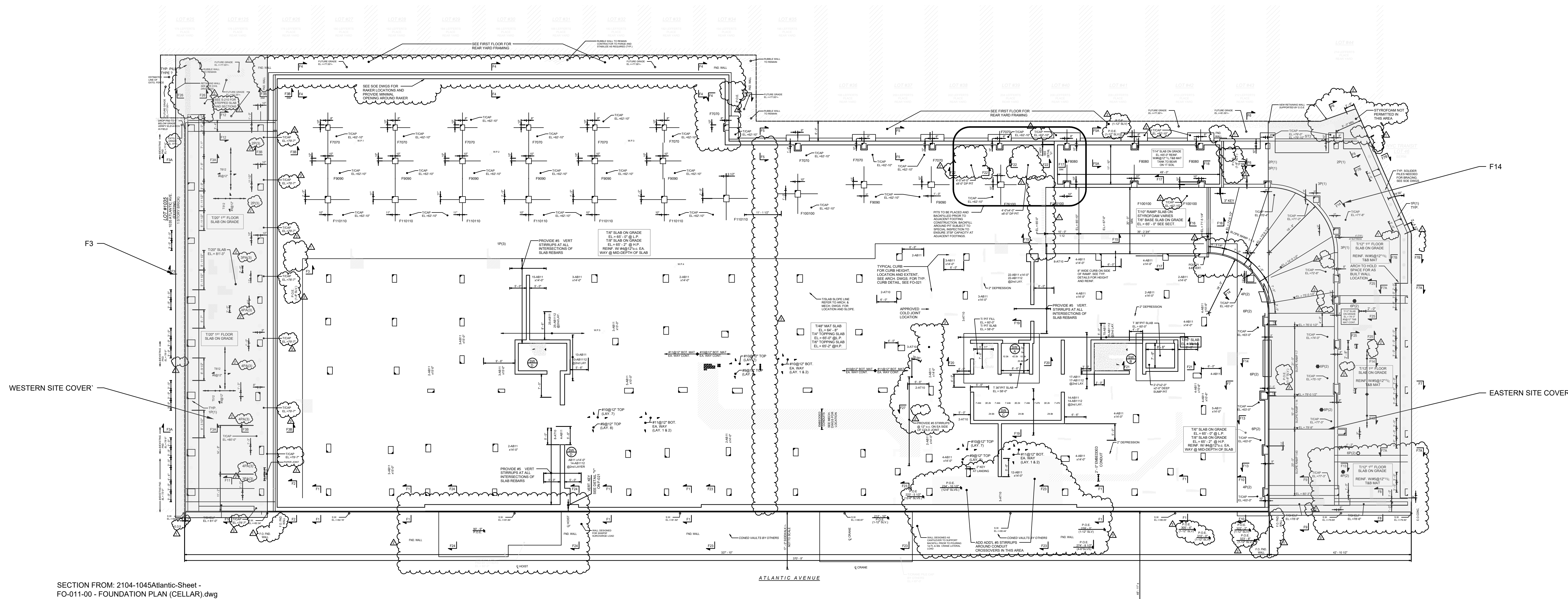
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**SECTION F3**  
SCALE: NOT TO SCALE



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FO-023-00 - FOUNDATION SECTIONS 2.dwg

**SECTION F14**  
SCALE: NOT TO SCALE



SECTION FROM: 2104-1045Atlantic-Sheet -  
FO-011-00 - FOUNDATION PLAN (CELLAR).dwg

**SITE COVER - PLAN VIEW**  
SCALE: NOT TO SCALE

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4	AS-BUILTS	11/14/2024
3	DEC REVIEW	06/30/2023
2	FOUNDATION BID SET REVISIONS	11/18/2022
1	100% DESIGN DEVELOPMENT	10/01/2022

Designed By	MTS	Date Submitted	11/14/2024
Drawn By	HDH	Date Submitted	10/01/2022
Reviewed By	MTS	Date	AS NOTED

1065 ATLANTIC AVENUE, LLC  
7 PENN PLAZA, SUITE 600  
NEW YORK, NY 10001

**SSDS AND SVE AS-BUILTS**

Project Address  
**1045-1065 ATLANTIC AVE  
BROOKLYN, NY 11238**

**SSDS AND SVE  
SYSTEM AS-BUILTS**



Inspector's Name: \_\_\_\_\_

Inspection Date: \_\_\_\_\_

Inspection Time: \_\_\_\_\_

Weather Conditions: \_\_\_\_\_

YES NO

- |                          |                          |  |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | Are any Low Vacuum Alarms on? Check BMS status of alarm.   |
| <input type="checkbox"/> | <input type="checkbox"/> | Are the Low Vacuum Alarms functioning? Check BMS status of alarm through testing.                  |
| <input type="checkbox"/> | <input type="checkbox"/> | Are the vacuum monitoring points accessible?   |
| <input type="checkbox"/> | <input type="checkbox"/> | Are the vacuum monitoring points properly secured?   |
| <input type="checkbox"/> | <input type="checkbox"/> | Are there any cracks, gaps, holes, penetrations, etc. observed in the building slab/vapor barrier? |
| <input type="checkbox"/> | <input type="checkbox"/> | Any visual damage to piping?   |
| <input type="checkbox"/> | <input type="checkbox"/> | Are SVE and SSDS Fans on?  |
| <input type="checkbox"/> | <input type="checkbox"/> | Are sample ports/vacuum gauges in good condition?  |

### Vacuum Monitoring Points

Monitoring Point ID	Vacuum (" WC)	PID (ppm)	Notes
VMP-1			
VMP-2			
VMP-3			
VMP-4			
VMP-5			
VMP-6			
VMP-7			
VMP-8			
VMP-9			

Comments:

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Maintenance Items:

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## APPENDIX F – EXCAVATION WORK PLAN (EWP)

### F-1 NOTIFICATION

At least 15 days prior to the start of an activity that is anticipated to encounter remaining contamination or breach or alter the Site's cover system within the Track 4 area, the Site owner or their representative will notify the NYSDEC contacts listed in the table below. Table C-1 includes contact information for the above notification. The information on this table will be updated as necessary to provide accurate contact information. A full listing of Site-related contact information is provided in Appendix B.

**Table F-1: Notifications\***

Jennifer Gonzalez NYSDEC Project Manager	718-482-4508, jennifer.gonzalez@dec.ny.gov
Andre Obligado NYSDEC Section Chief	718-482-6725, andre.obligado@dec.ny.gov
Kelly Lewandowski NYSDEC Site Control	Kelly.lewandowski@dec.ny.gov
James Sullivan NYSDOH Project Manager	(518) 402-5584 Jim.Sullivan@health.ny.gov

\* Note: Notifications are subject to change and will be updated as necessary.

This notification will include:

- A detailed description of the work to be performed, including the location and areal extent of excavation, plans/drawings for Site re-grading, intrusive elements or utilities to be installed below the soil cover, estimated volumes of contaminated soil to be excavated, modifications of truck routes, and work that may impact an engineering control;
- A summary of environmental conditions anticipated to be encountered in the work areas, including the nature and concentration levels of contaminants of concern, potential presence of grossly contaminated media, and plans for pre-construction sampling;
- A schedule for the work, detailing the start and completion of intrusive work, and submittals (e.g., reports) to the NYSDEC documenting the completed intrusive work;
- A summary of the applicable components of this EWP;
- A statement that the work will be performed in compliance with this EWP, 29 CFR 1910.120 and 29 CFR 1926 Subpart P;

- A copy of the contractor's health and safety plan (HASP), in electronic format, if it differs from the HASP provided in Appendix G of this SMP;
- Identification of disposal facilities for potential waste streams; and
- Identification of sources of anticipated backfill, along with the required request to import form and supporting documentation including, but not limited to, chemical testing results.

The NYSDEC project manager will review the notification and may impose additional requirements for the excavation that are not listed in this EWP. The alteration, restoration and modification of engineering controls must conform with Article 145 Section 7209 of the Education Law regarding the application of professional seals and alterations.

## **F-2 SOIL SCREENING METHODS**

Visual, olfactory, and instrument-based (e.g. photoionization detector) soil screening will be performed during excavations into known or potentially contaminated material (remaining contamination) or a breach of the cover system. A qualified environmental professional as defined in 6 NYCRR Part 375, a PE who is licensed and registered in New York State or a qualified person who directly reports to a PE who is licensed and registered in New York State will perform the screening. Soil screening will be performed when invasive work is done and will include excavation and invasive work performed during development, such as excavations for foundations and utility work, after issuance of the COC.

Soils will be segregated based on previous environmental data and screening results into material that requires off-site disposal and material that requires testing to determine if the material can be reused on-site as soil beneath a cover or if the material can be used as cover soil. Further discussion of off-site disposal of materials and on-site reuse is provided in Section 7 of this Appendix.

## **F-3 SOIL STAGING METHODS**

Soil stockpiles will be continuously encircled with a berm and/or silt fence. Hay bales will be used as needed near catch basins, surface waters and other discharge points.

Stockpiles will be kept covered with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced.

Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by the NYSDEC.

#### **F-4 MATERIALS EXCAVATION AND LOAD-OUT**

A qualified environmental professional as defined in 6 NYCRR Part 375, a PE who is licensed and registered in New York State, or a qualified person who directly reports to a PE who is licensed and registered in New York State will oversee invasive work and the excavation and load-out of excavated material.

The owner of the property and remedial party (if applicable) and its contractors are responsible for safe execution of invasive and other work performed under this Plan.

The presence of utilities and easements on the Site will be investigated by the qualified environmental professional. It will be determined whether a risk or impediment to the planned work under this SMP is posed by utilities or easements on the Site. A Site utility stakeout will be completed for utilities prior to ground intrusive activities at the Site.

Loaded vehicles leaving the Site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and NYSDOT requirements (and other applicable transportation requirements). Trucks transporting contaminated soil must have either tight-fitting opaque covers that are secured on the sides and/or back or opaque covers that are locked on the sides.

A truck wash will be operated on-site, as appropriate. The qualified environmental professional will be responsible for ensuring that outbound trucks will be washed at the truck wash before leaving the Site until the activities performed under this section are

complete. Truck wash waters will be collected and disposed of off-site in an appropriate manner.

Locations where vehicles enter or exit the Site shall be inspected daily for evidence of off-site soil tracking.

The qualified environmental professional will be responsible for ensuring that egress points for truck and equipment transport from the Site are clean of dirt and other materials derived from the Site during intrusive excavation activities. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to Site-derived materials. Material accumulated from the street cleaning and egress cleaning activities will be disposed off-site at a permitted landfill facility in accordance with applicable local, State, and Federal regulations.

#### **F-5 MATERIALS TRANSPORT OFF-SITE**

Transport of materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded.

Material transported by trucks exiting the Site will be secured with either tight-fitting opaque covers that are secured on the sides and/or back or opaque covers that are locked on the sides. Loose-fitting canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used.

Truck transport routes are as follows:

- Exit the property and head west on Atlantic Avenue for 2.4 miles.
- Turn left (south) onto Columbia Street for 0.1 mile.
- Merge onto the Brooklyn Queens Expressway West toward Staten Island

Trucks loaded with Site materials will exit the vicinity of the Site using only these approved truck routes. This is the most appropriate route and takes into account: (a)

limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off-site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport.

Trucks will be prohibited from stopping and idling in the neighborhood outside the project Site.

Egress points for truck and equipment transport from the Site will be kept clean of dirt and other materials during Site remediation and development.

Queuing of trucks will be performed on-site in order to minimize off-site disturbance. Off-site queuing will be prohibited.

#### **F-6 MATERIALS DISPOSAL OFF-SITE**

Material excavated and removed from the Site will be treated as contaminated and regulated material and will be transported and disposed off-site in a permitted facility in accordance with local, State, and Federal regulations. If disposal of material from this Site is proposed for unregulated off-site disposal (i.e. clean soil removed for development purposes), a formal request with an associated plan will be made to the NYSDEC project manager. Unregulated off-site management of materials from this Site will not occur without formal NYSDEC project manager approval.

Off-site disposal locations for excavated soils will be identified in the pre-excavation notification. This will include estimated quantities and a breakdown by class of disposal facility if appropriate, (e.g. hazardous waste disposal facility, solid waste landfill, petroleum treatment facility, C&D debris recovery facility). Actual disposal quantities and associated documentation will be reported to the NYSDEC in the Periodic Review Report. This documentation will include, but will not be limited to: waste profiles, test results, facility acceptance letters, manifests, bills of lading and facility receipts.

Non-hazardous historic fill and contaminated soils taken off-site will be handled consistent with 6 NYCRR Parts 360, 361, 362, 363, 364 and 365. Material that does not meet Unrestricted SCOs is prohibited from being taken to a New York State C&D debris recovery facility (6 NYCRR Subpart 360-15 registered or permitted facility).

## **F-7 MATERIALS REUSE ON-SITE**

The qualified environmental professional, as defined in 6 NYCRR Part 375, will ensure that procedures defined for materials reuse in this SMP are followed and that unacceptable material (i.e. contaminated) does not remain on-site. Contaminated on-site material, including historic fill and contaminated soil, that is acceptable for reuse on-site will be placed below the demarcation layer or impervious surface, and will not be reused within the cover system or within landscaping berms. Contaminated on-site material may only be used beneath the Site cover as backfill for subsurface utility lines with prior approval from the DEC project manager. If such activity is to be performed at the site, an NYSDEC Request to Import/Reuse Fill or Soil form, which can be found at <http://www.dec.ny.gov/regulations/67386.html>, will be prepared and submitted to the NYSDEC project manager allowing a minimum of 5 business days for review. This form is included in this Appendix as **Attachment F-1**.

Proposed materials for reuse on-site must be sampled for full suite analytical parameters including per- and polyfluoroalkyl substances (PFAS) and 1,4-dioxane. The sampling frequency will be in accordance with DER-10 Table 5.4(e)10 unless prior approval is obtained from the NYSDEC project manager for modification of the sampling frequency. The analytical results of soil/fill material testing must meet the Site use criteria presented in NYSDEC DER-10 Appendix 5 – Allowable Constituent Levels for Imported Fill or Soil for the constituents listed, and the NYSDEC Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances guidance values. Approvals for modifications to the analytical parameters must be obtained from the NYSDEC project manager prior to the sampling event.

Soil/fill material for reuse on-site will be segregated and staged as described in Sections F-2 and F-3 of this EWP. The anticipated size and location of stockpiles will be



provided in the 15-day notification to the NYSDEC project manager. Stockpile locations will be based on the location of Site excavation activities and proximity to nearby Site features. Material reuse on-site will comply with requirements of NYSDEC DER-10 Section 5.4(e)4. Modifications to the requirements of DER-10 Section 5.4(e)4 must be approved by the NYSDEC project manager.

Demolition material proposed for reuse on-site will be sampled for asbestos and the results will be reported to the NYSDEC for acceptance. Concrete crushing or processing on-site will not be performed without prior NYSDEC approval. Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the Site will not be reused on-site.

## **F-8 FLUIDS MANAGEMENT**

Liquids to be removed from the Site, including but not limited to, excavation dewatering, decontamination waters, and groundwater monitoring well purge and development waters, will be handled, transported, and disposed off-site at a permitted facility in accordance with applicable local, State, and Federal regulations. Dewatering, purge, and development fluids will not be recharged back to the land surface or subsurface of the Site and will be managed off-site, unless prior approval is obtained from NYSDEC.

Discharge of water generated during large-scale construction activities to surface waters (i.e. a local pond, stream or river) will be performed under a SPDES permit.

## **C-9 COVER SYSTEM RESTORATION**

After the completion of soil removal or other invasive activities within the Track 4 area, the cover system will be restored. This cover system is composed of concrete slabs that also act as the demarcation layer. The slabs are 12 inches thick on the eastern concrete slab at the first floor, 20 inches thick on the western concrete slab at the first floor, and 16 to 20 inches thick on the ramp into the cellar. Restoration will include repairing the slab to match the pre-existing thickness. A figure showing the modified surface will be included in the subsequent Periodic Review Report and in an updated SMP. The alteration,

restoration and modification of engineering controls must conform with Article 145 Section 7209 of the Education Law regarding the application professional seals and alterations.

#### **F-10 BACKFILL FROM OFF-SITE SOURCES**

Materials proposed for import onto the Site will be approved by the qualified environmental professional, as defined in 6 NYCRR Part 375, and will be in compliance with provisions in this SMP prior to receipt at the Site. A Request to Import/Reuse Fill or Soil form, which can be found at <http://www.dec.ny.gov/regulations/67386.html>, will be prepared and submitted to the NYSDEC project manager allowing a minimum of 5 business days for review. This form is included in this Appendix as **Attachment F-1**.

Material from industrial sites, spill sites, other environmental remediation sites, or potentially contaminated sites will not be imported to the Site.

Imported soils will meet the backfill and cover soil quality standards established in 6 NYCRR 375-6.7(d) and DER-10 Appendix 5 for restricted residential use. Soils that meet ‘general’ fill requirements under 6 NYCRR Part 360.13, but do not meet backfill or cover soil objectives for this Site, will not be imported onto the Site without prior approval by NYSDEC project manager. Soil material will be sampled for the full suite of analytical parameters, including PFAS and 1, 4-dioxane. Solid waste will not be imported onto the Site.

Trucks entering the Site with imported soils will be securely covered with tight fitting covers. Imported soils will be stockpiled separately from excavated materials and covered to prevent dust releases.

#### **F-11 STORMWATER POLLUTION PREVENTION**

Barriers and hay bale checks will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by the NYSDEC. Necessary repairs shall be made immediately.

Accumulated sediments will be removed as required to keep the barrier and hay bale check functional.

Undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials.

Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

Erosion and sediment control measures identified in the SMP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters.

Silt fencing or hay bales will be installed around the entire perimeter of the construction area.

## **F-12 EXCAVATION CONTINGENCY PLAN**

If underground tanks or other previously unidentified contaminant sources are found during post-remedial subsurface excavations or development related construction, excavation activities will be suspended until sufficient equipment is mobilized to address the condition. The NYSDEC project manager will be promptly notified of the discovery.

Sampling will be performed on product, sediment and surrounding soils, etc. as necessary to determine the nature of the material and proper disposal method. Chemical analysis will be performed for a full list of analytes [TAL metals, TCL volatiles and semi-volatiles (including 1,4-dioxane), TCL pesticides and PCBs, and PFAS], unless the Site history and previous sampling results provide sufficient justification to limit the list of analytes. In this case, a reduced list of analytes will be proposed to the NYSDEC project manager for approval prior to sampling. Tanks will be closed as per NYSDEC regulations and guidance.

Identification of unknown or unexpected contaminated media identified by screening during invasive Site work will be promptly communicated by phone within two hours to NYSDEC's Project Manager. Reportable quantities of petroleum product will also be reported to the NYSDEC Spills hotline. These findings will be also included in the Periodic Review Report.

### **F-13 COMMUNITY AIR MONITORING PLAN**

A figure showing the location of air sampling stations based on generally prevailing wind conditions will be provided after soil disturbing activities are performed, if necessary. These locations will be adjusted on a daily or more frequent basis based on actual wind directions to provide an upwind and at least two downwind monitoring stations.

Exceedances of action levels listed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers.

#### **F-13A: Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures**

When work areas are within 20 feet of potentially exposed populations or occupied structures, the continuous monitoring locations for VOCs and particulates must reflect the nearest potentially exposed individuals and the location of ventilation system intakes for nearby structures. The use of engineering controls such as vapor/dust barriers, temporary negative-pressure enclosures, or special ventilation devices should be considered to prevent exposures related to the work activities and to control dust and odors. Consideration should be given to implementing the planned activities when potentially exposed populations are at a minimum, such as during weekends or evening hours in non-residential settings.

- If total VOC concentrations opposite the walls of occupied structures or next to intake vents exceed 1 part-per-million, monitoring should occur within the occupied structure(s). Depending upon the nature of contamination, chemical-specific colorimetric tubes of sufficient sensitivity may be necessary for comparing the exposure point concentrations with appropriate pre-determined response levels (response actions should also be pre-determined). Background readings in the occupied spaces must be taken prior to commencement of the planned work.

Unusual background readings should be discussed with NYSDOH prior to commencement of the work.

- If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed 150 micrograms per cubic meter, work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 micrograms per cubic meter or less at the monitoring point.
- Depending upon the nature of contamination and remedial activities, other parameters (e.g., explosivity, oxygen, hydrogen sulfide, carbon monoxide) may also need to be monitored. Response levels and actions should be pre-determined, as necessary, for each site.

### **F-13B: Special Requirements for Indoor Work with Co-Located Residences or Facilities**

Unless a self-contained, negative-pressure enclosure with proper emission controls will encompass the work area, all individuals not directly involved with the planned work must be absent from the room in which the work will occur. Monitoring requirements shall be as stated above under “Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures” except that in this instance “nearby/occupied structures” would be adjacent occupied rooms. Additionally, the location of exhaust vents in the room and their discharge points, as well as potential vapor pathways (openings, conduits, etc.) relative to adjoining rooms, should be understood and the monitoring locations established accordingly. In these situations, it is strongly recommended that exhaust fans or other engineering controls be used to create negative air pressure within the work area during remedial activities. Additionally, it is strongly recommended that the planned work be implemented during hours (e.g. weekends or evenings) when building occupancy is at a minimum.

## **F-14 ODOR CONTROL PLAN**

This odor control plan is capable of controlling emissions of nuisance odors off-site and on-site. Specific odor control methods to be used on a routine basis will include

limiting open excavations, use of tarping, hydromulch, or encapsulant to cover soils during excavations, direct loading of soils, use of chemical odorants, piping discharge SVE and SSDS air outside and away from occupied areas, use of vapor phase carbon units to filter air, and monitoring air at and beyond property lines. If nuisance odors are identified at the Site boundary, or if odor complaints are received, work will be halted and the source of odors will be identified and corrected. Work will not resume until nuisance odors have been abated. NYSDEC and NYSDOH will be notified of odor events and of other complaints about the project. Implementation of odor controls, including the halt of work, is the responsibility of the remedial party's Remediation Engineer, and measures that are implemented will be discussed in the Periodic Review Report.

Necessary means will be employed to prevent on- and off-site nuisances. At a minimum, these measures will include: (a) limiting the area of open excavations and size of soil stockpiles; (b) shrouding open excavations with tarps and other covers; and (c) using foams to cover exposed odorous soils. If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include: (d) direct load-out of soils to trucks for off-site disposal; (e) use of chemical odorants in spray or misting systems; and, (f) use of staff to monitor odors in surrounding neighborhoods.

If nuisance odors develop during intrusive work that cannot be corrected, or where the control of nuisance odors cannot otherwise be achieved due to on-site conditions or close proximity to sensitive receptors, odor control will be achieved by sheltering the excavation and handling areas in a temporary containment structure equipped with appropriate air venting/filtering systems.

## **F-15 DUST CONTROL PLAN**

Particulate monitoring must be conducted according to the Community Air Monitoring Plan (CAMP) provided in Section C-13. If particulate levels at the Site exceed the thresholds listed in the CAMP or if airborne dust is observed on the Site or leaving the Site, the dust suppression techniques listed below will be employed. The remedial party will also take measures listed below to prevent dust production on the Site.

A dust suppression plan that addresses dust management during invasive on-site work will include, at a minimum, the items listed below:

- Dust suppression will be achieved using a dedicated on-site water truck for road wetting. The truck will be equipped with a water cannon capable of spraying water directly onto off-road areas including excavations and stockpiles.
- Clearing and grubbing of larger sites will be done in stages to limit the area of exposed, unvegetated soils vulnerable to dust production.
- Gravel will be used on roadways to provide a clean and dust-free road surface.
- On-site roads will be limited in total area to minimize the area required for water truck sprinkling.

#### **F-16 OTHER NUISANCES**

A plan for rodent control will be developed and utilized by the contractor prior to and during Site clearing and Site grubbing, and during remedial work.

A plan will be developed and utilized by the contractor for remedial work to ensure compliance with local noise control ordinances.



## **Attachment F-1**



**NEW YORK STATE  
DEPARTMENT OF ENVIRONMENTAL CONSERVATION**



**Request to Import/Reuse Fill or Soil**

\*This form is based on the information required by DER-10, Section 5.4(e) and 6NYCRR Part 360.13. Use of this form is not a substitute for reading the applicable regulations and Technical Guidance document.\*

**SECTION 1 – SITE BACKGROUND**

The allowable site use is:

Have Ecological Resources been identified?

Is this soil originating from the site?

How many cubic yards of soil will be imported/reused?

If greater than 1000 cubic yards will be imported, enter volume to be imported:

**SECTION 2 – MATERIAL OTHER THAN SOIL**

Is the material to be imported gravel, rock or stone?

Does it contain less than 10%, by weight, material that passes a size 100 sieve?

Is this virgin material from a permitted mine or quarry?

Is this material recycled concrete or brick from a DEC registered processing facility?

**SECTION 3 - SAMPLING**

Provide a brief description of the number and type of samples collected in the space below:

-----  
*Example Text: 5 discrete samples were collected and analyzed for VOCs. 2 composite samples were collected and analyzed for SVOCs, Inorganics & PCBs/Pesticides.*

*If the material meets requirements of DER-10 section 5.4(e)5 (other material), no chemical testing needed.*

### SECTION 3 CONT'D - SAMPLING

Provide a brief written summary of the sampling results or attach evaluation tables (compare to DER-10, Appendix 5):

---

*Example Text: Arsenic was detected up to 17 ppm in 1 (of 5) samples; the allowable level is 16 ppm.*

*If Ecological Resources have been identified use the "If Ecological Resources are Present" column in Appendix 5.*

### SECTION 4 – SOURCE OF FILL

Name of person providing fill and relationship to the source:

Location where fill was obtained:

Identification of any state or local approvals as a fill source:

If no approvals are available, provide a brief history of the use of the property that is the fill source:

Provide a list of supporting documentation included with this request:

The information provided on this form is accurate and complete.

---

Signature

---

Date

---

Print Name

---

Firm

## **APPENDIX G**

### **HEALTH and SAFETY PLAN**

**ATLANTIC BROOKLYN PROJECT  
1045 TO 1065 ATLANTIC AVENUE  
BROOKLYN, NY 11238  
NYSDEC BCP ID: C224305**

**SITE MANAGEMENT  
HEALTH AND SAFETY PLAN**

**PREPARED FOR:**

1065 Atlantic Brooklyn Avenue, LLC.  
7 Penn Plaza, Suite 600  
New York, New York 10001

**PREPARED BY:**



P.W. Grosser Consulting Engineer & Hydrogeologist, PC  
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PWGC Project Number: TOT2201

**NOVEMBER 2024**



**SITE MANAGEMENT HEALTH AND SAFETY PLAN  
ATLANTIC BROOKLYN PROJECT  
1045 TO 1065 ATLANTIC AVENUE, BROOKLYN, NY 11238**

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### STATEMENT OF COMMITMENT

On-site employees may be exposed to chemical contaminants of concern identified within the soil/fill during the post-remedial and construction activities that may be performed on the Atlantic Brooklyn Project located at 1045 to 1065 Atlantic Avenue in Brooklyn, New York project ("Site"). P.W. Grosser Consulting Engineer & Hydrogeologist, P.C.'s (PWGC's) policy is to minimize the possibility of work-related exposure through awareness and qualified supervision, health and safety training, use of appropriate personal protective equipment, and the following activity specific safety protocols contained in this Site Management Plan (SMP) Health and Safety Plan (HASP). PWGC has established a guidance program to implement this policy in a manner that protects personnel to the maximum reasonable extent.

This SMP HASP describes emergency response procedures for actual and potential chemical hazards. Persons are to acknowledge that they understand the potential hazards and the contents of this Health and Safety policy by signing off on receipt of their individual copy of the document. Contractors and suppliers are retained as independent contractors and are responsible for ensuring the health and safety of their own employees as it relates to general construction practices.

## 1.0 INTRODUCTION AND SITE ENTRY REQUIREMENTS

This document describes the health and safety guidelines developed by P.W. Grosser Consulting Engineer & Hydrogeologist, P.C. (PWGC) at the request of 1065 Atlantic Brooklyn Avenue, LLC. for the proposed environmental Site Management activities to be performed at the site located at 1045 to 1065 Atlantic Avenue, Brooklyn, New York Site to protect on-site personnel, visitors, and the public from exposure to hazardous materials or wastes. In accordance with the Occupational Safety and Health Administration (OSHA) 29 CFR Part 1910.120 Hazardous Waste Operations and Emergency Response Final rule, this SMP HASP, including the attachments, addresses safety and health hazards relating to each phase PWGC on-site work activities, as detailed in the SMP for the Site and is based on the best information available. The SMP HASP may be revised by PWGC at the request of 1065 Atlantic Brooklyn Avenue, LLC. upon receipt of new information regarding Site conditions. Changes will be documented by written amendments.

### 1.1. Site Safety Plan Acceptance, Acknowledgment, and Amendments

The project superintendent and the Site safety officer are responsible for informing personnel entering the work area of the contents of this plan and ensuring that each person signs the safety plan acknowledging the on-site hazards and procedures required to minimize exposure to adverse effects of these hazards. A copy of the Acknowledgement Form is included in **Appendix A**.

Site conditions may warrant an amendment to the SMP HASP. Amendments to the SMP HASP are acknowledged by completing forms included in **Appendix B**.

### 1.2. Daily Safety Meetings

Each day before work begins, if performed; the Site safety officer will hold safety (tailgate or tool box) meetings to ensure that on-site personnel understand the Site conditions and operating procedures and to address safety questions and concerns. Meeting minutes and attendance will be recorded. Project staff will discuss and remedy health and safety issues at these meetings.

### 1.3. Key Personnel – Roles and Responsibilities

The following key personnel are planned for this project:

- Project Manager – Ms. Jennifer Lewis, PG
- Site Safety Officer – Mr. Andres Ballares or designee

The project manager is responsible for overall project administration and, with guidance from the Site safety officer, for supervising the implementation of this SMP HASP. The Site safety officer will conduct daily (tail gate or toolbox) safety meetings, at the project Site and oversee daily safety issues, as necessary. Each subcontractor and supplier (defined as an OSHA employer) is also responsible for the health and safety of its employees. If there is any dispute about health and safety or project activities, on-site personnel will attempt to resolve the issue. If the issue cannot be resolved at the Site, then the project manager will be consulted.

If the incident involved a construction worker, the General Contractor or subcontractor that employed the worker must report every incident that occurred on every construction site subject to permitting by the Department. Regardless of whether the incident involved a

violation of this Code or any other law or rule, the incident must be reported if it resulted in either:

- fatality to any individual, including a member of the general public or a construction worker; or,
- an injury to any individual, including a member of the general public or a construction worker, that requires transport by emergency medical services or requires immediate emergency care at a hospital or offsite medical clinic.

In addition to these reporting requirements, the project manager is responsible for ensuring that PWGC personnel assigned to the construction site have the appropriate training.

The Site safety officer is responsible for the following:

1. Educating personnel about information in this SMP HASP and other safety requirements to be observed during site operations, including, but not limited to, designation of work zones and levels of protection and emergency procedures dealing with fire and first aid.
2. Coordinating Site safety decisions with the project manager.
3. Monitoring the condition and status of known on-site hazards specified in this SMP HASP.
4. Maintaining the work zone entry/exit log and Site entry/exit log.
5. Maintaining records of safety problems, corrective measures and documentation of chemical exposures or physical injuries (the Site safety officer will document these conditions in a bound notebook and maintain a copy of the notebook on-site).
6. Reporting injuries/incidences that occur on Site, regardless of if it includes a PWGC employee or other person on the Site, to the project manager as soon as possible following the incident.

The person who observes safety concerns and potential hazards that have not been addressed in the daily safety meetings should immediately report their observations/concerns to the Site safety officer or appropriate key personnel.

## 2.0 SITE BACKGROUND AND REMEDIAL ACTIONS

The site is located at 1045 to 1065 Atlantic Avenue in the Bedford-Stuyvesant neighborhood of Brooklyn, New York and was most recently identified as Block 2020, Lots 77, 74, 73, 70, and 68 (the lots have since been merged into Lot 68) of the New York City Tax Map. The Site is 1.08 acres and is bounded by residential properties to the north; commercial and industrial properties to the west, south and east; an elevated railroad to the east; and Atlantic Avenue to the south. The site is currently under development for the construction of a 17-story (175-feet in height) mixed-use building with a cellar.

The groundwater table at the Site was encountered between 70 and 73 feet below field grade surface and groundwater generally flows to the northwest at a relatively flat gradient.

Remedial activities at the site included the following:

- Removal of soils impacted with volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and metals, as well as additional deeper soils as needed for construction of the new building. The building's foundation is the demarcation barrier above the residual contamination left in place.
- Installation of a sub-slab depressurization system (SSDS) beneath the new building's foundation to mitigate against soil vapor intrusion concerns.
- Installation of a soil vapor extraction (SVE) system to target mass removal of VOC compounds identified in the subsurface and to mitigate vapor migration to the neighboring properties to the north.
- Construction of site cover system (the building's foundation) to prevent direct contact with remaining soil contamination in the subsurface.

### 3.0 POTENTIAL HAZARDS OF THE SITE

This section presents an assessment of the chemical, biological, and physical hazards that may be encountered.

#### 3.1. Chemical Hazards

Soil analytical results detected concentrations of volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and metals in exceedance of Unrestricted Use Soil Cleanup Objectives (SCOs) in several of the boring locations. The majority of contaminants were located in shallow soils. No PCBs were detected at concentrations in excess of the Unrestricted Use SCOs.

##### VOCs:

Soil concentrations of 2-Butanone, Tetrachloroethene (PCE), Trichloroethene (DCE), and total Xylenes exceeded Unrestricted use SCOs.

##### SVOCs:

Soil concentrations of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene exceeded Restricted Residential Use SCOs.

3-Methylphenol/4-Methylphenol, and benzo(k)fluoranthene exceeded Unrestricted Use SCOs.

##### Metals:

Soil concentrations of cadmium, copper, lead, hexavalent chromium, nickel, mercury, trivalent chromium, and zinc exceeded Unrestricted Use SCOs. Lead, mercury, nickel, and trivalent chromium also exceeded Restricted Residential Use SCOs.

Multiple VOCs were detected in soil vapor collected from the subject property. The chlorinated compounds DCE, methylene chloride, TCE, and PCE were detected in soil vapor samples.

**Appendix C** includes information sheets for the known and suspected chemicals that may be encountered at the Site.

#### 3.2. Biological Hazards

Work will be performed in an urban setting. During the course of the project, there is potential for workers to come into contact with biological hazards such as animals or insects.

##### 3.2.1. Animals

The Site is located in a predominantly urban area. It is possible that dogs, cats, and rodents may be present. Workers shall use discretion and avoid all contact with animals.

##### 3.2.2. Insects

Insects, such as mosquitoes, ticks, bees, and wasps may be present during certain times of the year. Workers will be encouraged to wear appropriate repellents, if they don't contain PFAS compounds, and PPE, if deemed necessary, when working in areas where insects are expected to be present.

### 3.3. Physical Hazards

During the project, there is potential for workers to come into contact with physical hazards such as heat stress, cold stress, noise, fire, airplanes, and explosions.

#### 3.3.1. *Temperature Extremes*

##### Heat Stress

Heat stress is a significant potential hazard, which is greatly exacerbated with the use of PPE in hot environments. The potential hazards of working in hot environments include dehydration, cramps, heat rash, heat exhaustion, and heat stroke.

##### Cold Stress

At certain times of the year, workers may be exposed to the hazards of working in cold environments. Potential hazards in cold environments include frostbite, trench foot or immersion foot, hypothermia as well as slippery surfaces, brittle equipment, and poor judgment.

PWGC's Heat/Cold Stress Protocols are specified in **Appendix D**.

#### 3.3.2. *Steam, Heat, and Splashing*

Exposure to steam, heat, and splashing hazards can occur during steam cleaning activities. Splashing can also occur during well development and sampling activities. Exposure to steam, heat, and splashing can result in scalding or burns, eye injury, and puncture wounds.

#### 3.3.3. *Noise*

Noise is a potential hazard associated with the operation of heavy equipment, drill rigs, pumps, and engines. Workers will wear hearing protection while in the work zone when these types of machinery are operating.

#### 3.3.4. *Fire and Explosion*

When conducting excavation or drilling activities, the opportunity of encountering fire and explosion hazards may exist from encountering underground utilities, from the use of diesel engine equipment, propane, liquefied petroleum gas, and other potential ignition sources. During dry periods there is an increased chance of forest and brush fires starting at the job Site. No smoking will be permitted at the Site and all operations involving potential ignition sources will be monitored continuously (fire watch).

#### 3.3.5. *Manual Lifting/Material Handling*

Manual lifting of heavy objects may be required. Failure to follow proper lifting technique can result in back injuries and strains. Back injuries are a serious concern as they are the most common workplace injury, often resulting in lost or restricted work time, and long treatment and recovery periods.

#### 3.3.6. *Slips, Trips, and Falls*

Working in and around the Site will pose slip, trip, and fall hazards due to slippery surfaces that may be oil covered, or from rough terrain, surfaces that are steep inclines, surfaced debris, or surfaces which are wet from rain or ice. Falls may result in twisted ankles, broken bones, head trauma, or back injuries.



#### **3.3.7. Heavy Equipment Operation**

Drilling equipment will be utilized for the installation of soil borings and groundwater monitoring wells and an excavator/backhoe may be used to excavate where required. Working with or near heavy equipment poses many potential hazards, including electrocution, fire/explosion, being struck by or against, or pinched/caught/crushed by, and can result in serious physical harm.

#### **3.3.8. Electrocution**

Encountering underground utilities may pose electrical hazards to workers. Additionally, overhead electrical lines can be a concern during drilling operations. Potential adverse effects of electrical hazards include burns and electrocution, which could result in death.

#### 4.0 PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment (PPE) shall be selected in accordance with OSHA 29 CFR 1910.120(c), (g), and 1910.132. Protective equipment shall be NIOSH approved and respiratory protection shall conform to OSHA 29 CFR Part 1910.133 and 1910.134 specifications; head protection shall conform to 1910.135; eye and face protection shall conform to 1910.133; and foot protection shall conform to 1910.136. The only true difference among the levels of protection from D thru B is the addition of the type of respiratory protection. **It is anticipated that work will be performed in Level D PPE.**

##### 4.1. Level D

Level D PPE shall be donned when the atmosphere contains no known hazards and work functions preclude splashes, immersion, or the potential for inhalation of, or contact with, hazardous concentrations of harmful chemicals. Level D PPE consists of:

- standard work uniform, coveralls, or 7yvek, as needed;
- steel toe work boots;
- hard hat;
- gloves, as needed;
- safety glasses;
- hearing protection;
- equipment replacements are available as needed.

##### 4.2. Level C

Level C PPE shall be donned when the concentrations of measured total organic vapors in the breathing zone exceed background concentrations (using a portable OVA, or equivalent), but are less than 5 ppm. The specifications on the APR filters used must be appropriate for contaminants identified or expected to be encountered. Level C PPE shall be donned when the identified contaminants have adequate warning properties and criteria for using APR have been met. Level C PPE consists of:

- chemical resistant or coated tyvek coveralls;
- steel-toe work boots;
- chemical resistant over boots or disposable boot covers;
- disposable inner gloves (surgical gloves);
- disposable outer gloves;
- full face APR fitted with organic vapor/dust and mist filters or filters appropriate for the identified or expected contaminants;
- hard hat;
- splash shield, as needed; and,
- ankles/wrists taped with duct tape.

The Site safety officer will verify if Level C is appropriate by checking organic vapor concentrations using compound and/or class-specific detector tubes.

##### 4.3. Level B

Level B PPE shall be donned when the contaminants have not been identified and/or the concentrations of unknown measured total organic vapors in the breathing zone exceed 5 ppm (using a portable OVA, or equivalent). Level B PPE shall be donned if the IDLH of a known contaminant is exceeded. If a contaminant is identified or is expected to be encountered for which NIOSH and/or OSHA recommend the use of a positive pressure self-contained breathing apparatus (SCBA) when that contaminant is present, Level B PPE shall

be donned even though the total organic vapors in the breathing zone may not exceed 5 ppm. Level B shall be donned for confined space entry, and when the atmosphere is oxygen deficient (oxygen less than 19.5%) or potentially oxygen deficient. If Level B PPE is required for a task, at least three people shall be donned in Level B at any one time during that task. PPE shall only be donned at the direction of the Site safety officer. Level B PPE consists of:

- supplied air SCBA or air line system with five minute egress system;
- chemical resistant coveralls;
- steel-toe work boots;
- chemical resistant over boots or disposable boot covers;
- disposable inner gloves;
- disposable outer gloves;
- hard hat; and,
- ankles/wrists taped.

The exact PPE ensemble is decided on a site-by-site basis by the PWGC Health and Safety Officer with the intent to provide the most protective and efficient worker PPE.

## 5.0 CONTINGENCY PLAN/EMERGENCY RESPONSE PLAN

Site personnel must be prepared in the event of an emergency. Emergencies can take many forms: illnesses, injuries, chemical exposure, fires, explosions, spills, leaks, releases of harmful contaminants, or sudden changes in the weather.

Emergency telephone numbers and a map to the hospital (**Figure 1**) will be posted in the command post. Site personnel should be familiar with the emergency procedures, and the locations of Site safety, first aid, and communication equipment. These will be outlined in the site specific SMP HASP.

### 5.1. Emergency Equipment On-site

Private telephones:	Site personnel.
Two-way radios:	Site personnel where necessary.
Emergency Alarms:	On-site vehicle horns*.
First aid kits:	On-site, in vehicles or office.
Fire extinguisher:	On-site, in office or on equipment.

\*Horns: Air horns will be supplied to personnel at the discretion of the project superintendent or Site safety officer.

### 5.2. Emergency Telephone Numbers

General Emergencies	911
New York City Police	911
Interfaith Medical Center	1-718-613-4000
NYSDEC Spills Division	1-800-457-7362
NYSDEC Hazardous Waste Division	1-718-482-4996
Fire Department	911
National Response Center	1-800-424-8802
Poison Control	1-212-764-7667
PWGC Headquarters	631-589-6353
Project Manager	631-589-6353

A copy of this page shall be posted in the office.

### 5.3. Personnel Responsibilities During an Emergency

The project manager is primarily responsible for responding to and correcting any emergency situations. However, in the absence of the project manager, the Site safety officer shall act as the project manager's on-site designee and perform the following tasks:

- Take appropriate measures to protect personnel;
- Ensure that appropriate federal, state, and local agencies are informed and emergency response plans are coordinated. In the event of fire or explosion, the local fire department should be summoned immediately. If toxic materials are released to the air, the local authorities should be informed in order to assess the need for evacuation;
- Ensure appropriate decontamination, treatment, or testing for exposed or injured personnel;
- Determine the cause of incidents and make recommendations to prevent recurrence; and,
- Ensure that all required reports have been prepared.

#### 5.4. Medical Emergencies

A person who becomes ill or injured, first aid will be administered while waiting for an ambulance or paramedics. A Field Accident Report (**Appendix E**) must be filled out for any injury.

A person transporting an injured/exposed person to a clinic or hospital for treatment will take the directions to the hospital and information on the chemical(s) to which they may have been exposed.

#### 5.5. Fire or Explosion

In the event of a fire or explosion, the local fire department will be summoned immediately. The Site safety officer or his designated alternate will advise the fire commander of the location, nature and identification of the hazardous materials on-site. If it is safe to do so, Site personnel may:

- use fire fighting equipment available on-site; or,
- remove or isolate flammable or other hazardous materials that may contribute to the fire.

#### 5.6. Evacuation Routes

Evacuation routes established by work area locations for each Site will be reviewed prior to commencing Site operations. As the work areas change, the evacuation routes will be altered accordingly, and the new route will be reviewed.

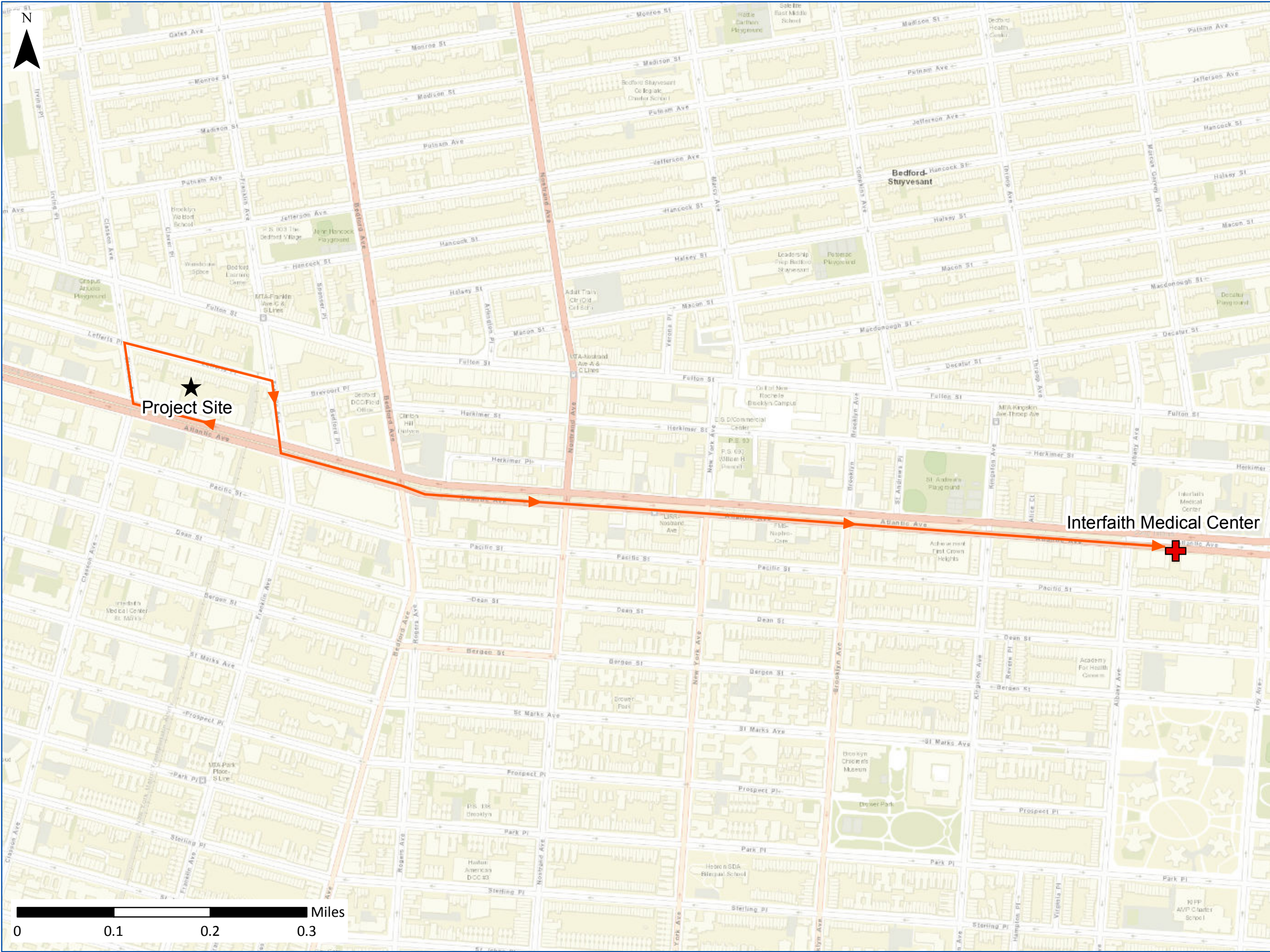
Under extreme emergency conditions, evacuation is to be immediate without regard for equipment. The evacuation signal will be a continuous blast of a vehicle horn, if possible, and/or by verbal/radio communication. When evacuating the Site, personnel will follow these instructions:

- Keep upwind of smoke, vapors, or spill location.
- Exit through the decontamination corridor if possible.
- If evacuation through the decontamination corridor is not possible, personnel should remove contaminated clothing once they are in a safe location and leave it near the exclusion zone or in a safe place.
- The Site safety officer will conduct a head count to ensure that all personnel have been evacuated safely. The head count will be correlated to the site and/or exclusion zone entry/exit log.
- If emergency Site evacuation is necessary, all personnel are to escape the emergency situation and decontaminate to the maximum extent practical.

## FIGURE







P.W. Grosser Consulting Engineer & Hydrogeologist, PC

630 Johnson Ave., Suite 7  
Bohemia, NY 11716  
Ph: 631-589-6353 • Fax: 631-589-8705  
pwgc.info@pwgros.com

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DRAWING PREPARED FOR:

REVISION	DATE	INITIAL	COMMENTS
DRAWING INFORMATION:			
Project:	TOT1903	Designed by:	HRM
Date:	4/7/2020	Drawn by:	TS
Scale:	AS SHOWN	Approved by:	HRM

**Hospital Route**  
1045-1065 Atlantic Ave  
to  
Interfaith Medical Center  
1545 Atlantic Avenue  
Brooklyn, NY

FIGURE NO:



## APPENDIX A





## **SITE SAFETY PLAN ACKNOWLEDGEMENT FORM**

I have been informed and understand the procedures set forth in the health and safety plan and amendments:

[illegible]

## APPENDIX B





## SITE SAFETY PLAN AMENDMENT FORM

SITE SAFETY PLAN AMENDMENT # \_\_\_\_\_: \_\_\_\_\_

SITE NAME: \_\_\_\_\_

REASON FOR AMENDMENT: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

ALTERNATIVE PROCEDURES: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

REQUIRED CHANGES IN PPE: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
PROJECT SUPERINTENDENT

\_\_\_\_\_  
DATE

\_\_\_\_\_  
HEALTH & SAFETY CONSULTANT

\_\_\_\_\_  
DATE

\_\_\_\_\_  
SITE SAFETY OFFICER

\_\_\_\_\_  
DATE

## APPENDIX C



## Safety Data Sheet

### 1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

#### 1.1 Product Identifier

**Material Name** : Fuels, diesel, no.2 CAS 68476-34-6  
**REACH Registration No.** : 01-2119475502-40-0005

#### 1.2 Relevant identified uses of the substance or mixture and uses advised against

**Product Use** : Please refer to Ch16 and/or the annexes for the registered uses under REACH.

**Uses Advised Against** : This product must not be used in applications other than those recommended in Section 1, without first seeking the advice of the supplier. This product is not to be used as a solvent or cleaning agent; for lighting or brightening fires; as a skin cleanser.

#### 1.3 Details of the Supplier of the safety data sheet

**Manufacturer/Supplier** : Shell Trading Rotterdam B.V.  
Weena 70  
3012 CM Rotterdam  
Netherlands

**Telephone** : +31 10 441 5000

**Email Contact for  
Safety Data Sheet** : TRsds@shell.com

#### 1.4 Emergency Telephone Number

: +44 (0)151 350 4595

### 2. HAZARDS IDENTIFICATION

#### 2.1 Classification of the substance or mixture

Regulation (EC) No 1272/2008 (CLP)	
Hazard classes / Hazard categories	Hazard Statement
Flammable liquids, Category 3	H226

**Safety Data Sheet**

Aspiration hazard, Category 1	H304
Acute toxicity, Category 4; Inhalation	H332
Skin corrosion/irritation, Category 2	H315
Carcinogenicity, Category 2	H351
Specific target organ toxicity - repeated exposure, Category 2; Blood.; Liver.; Thymus.	H373
Chronic hazards to the aquatic environment, Category 2	H411

67/548/EEC or 1999/45/EC	
Hazard Characteristics	R-phrases(s)
Harmful.; Dangerous for the environment.; Carcinogenic, category 3.; Irritant.	R20; R38; R40; R51/53; R65

Classification triggering components : Contains fuels, diesel.

**2.2 Label Elements****Labeling according to Regulation (EC) No 1272/2008**

Symbol(s) :



Signal Words : Danger

CLP Hazard Statements : PHYSICAL HAZARDS:  
H226: Flammable liquid and vapour.

HEALTH HAZARDS:  
H304: May be fatal if swallowed and enters airways.  
H315: Causes skin irritation.  
H332: Harmful if inhaled.  
H351: Suspected of causing cancer.  
H373: May cause damage to organs or organ systems through prolonged or repeated exposure.

ENVIRONMENTAL HAZARDS:  
H411: Toxic to aquatic life with long lasting effects.



**Safety Data Sheet****CLP Precautionary statements**

- Prevention** : P210: Keep away from heat/sparks/open flames/hot surfaces. - No smoking.  
P261: Avoid breathing dust/fume/gas/mist/vapours/spray.  
P280: Wear protective gloves/protective clothing/eye protection/face protection.
- Response** : P301+P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.  
P331: Do NOT induce vomiting.
- Disposal:** : P501: Dispose of contents and container to appropriate waste site or reclaimer in accordance with local and national regulations.

**Labeling according to Directive 1999/45/EC / 67/548/EEC**

- EC Symbols : Xn Harmful.  
N Dangerous for the environment.



- EC Classification : Harmful. Dangerous for the environment. Carcinogenic, category 3. Irritant.
- EC Risk Phrases : R20 Harmful by inhalation.  
R38 Irritating to skin.  
R40 Limited evidence of carcinogenic effect.  
R51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.  
R65 Harmful: may cause lung damage if swallowed.
- EC Safety Phrases : S2 Keep out of the reach of children.  
S24 Avoid contact with skin.  
S36/37 Wear suitable protective clothing and gloves.  
S61 Avoid release to the environment. Refer to special instructions/safety data sheets.  
S62 If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

**2.3 Other Hazards**

- Safety Hazards** : May ignite on surfaces at temperatures above auto-ignition

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temperature. Vapour in the headspace of tanks and containers may ignite and explode at temperatures exceeding auto-ignition temperature, where vapour concentrations are within the flammability range. Electrostatic charges may be generated during pumping. Electrostatic discharge may cause fire.

**Other Information** : This product is intended for use in closed systems only.

**3. COMPOSITION/INFORMATION ON INGREDIENTS****3.1 Substance**

**CAS No.** : 68476-34-6

**3.2 Mixtures**

**Mixture Description** : A distillate oil having a minimum viscosity of 32,6 SUS at 37,7 oC (100 oF). Product is not a mixture according to regulation 1907/2006/EC.

**Hazardous Components****Classification of components according to Regulation (EC) No 1272/2008**

Chemical Name	CAS No.	EINECS	REACH Registration No.	Conc.
Fuels, diesel, no.2	68476-34-6	270-676-1	01-2119475502-40	100,00%

Chemical Name	Hazard Class & Category	Hazard Statement
Fuels, diesel, no.2	Flam. Liq., 3; Asp. Tox., 1; Acute Tox., 4; Skin Corr., 2; Carc., 2; STOT RE, 2; Aquatic Chronic, 2;	H226; H304; H332; H315; H351; H373; H411;

**Classification of components according to 67/548/EEC**

Chemical Name	CAS No.	EINECS	REACH Registration No.	Symbol(s)	R-phrases	Conc.
Fuels, diesel, no.2	68476-34-6	270-676-1	01-2119475502-40	Xn, N, Xi	R20; R38; R40; R65; R51/53	100,00%

**Additional Information** : Refer to chapter 16 for full text of EC R-phrases.

## Safety Data Sheet

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### 4. FIRST AID MEASURES

#### 4.1 Description of First Aid Measures

- |   |   |   |
|---|---|---|
| <b>Inhalation</b>   | : | Remove to fresh air. If rapid recovery does not occur, transport to nearest medical facility for additional treatment.  |
| <b>Skin Contact</b>   | : | Remove contaminated clothing. Immediately flush skin with large amounts of water for at least 15 minutes, and follow by washing with soap and water if available. If redness, swelling, pain and/or blisters occur, transport to the nearest medical facility for additional treatment.   |
| <b>Eye Contact</b>  | : | Flush eye with copious quantities of water. If persistent irritation occurs, obtain medical attention.  |
| <b>Ingestion</b>  | : | If swallowed, do not induce vomiting: transport to nearest medical facility for additional treatment. If vomiting occurs spontaneously, keep head below hips to prevent aspiration. If any of the following delayed signs and symptoms appear within the next 6 hours, transport to the nearest medical facility: fever greater than 101° F (38.3°C), shortness of breath, chest congestion or continued coughing or wheezing. Give nothing by mouth. |
| <b>4.2 Most important symptoms and effects, both acute and delayed</b>                | : | If material enters lungs, signs and symptoms may include coughing, choking, wheezing, difficulty in breathing, chest congestion, shortness of breath, and/or fever. The onset of respiratory symptoms may be delayed for several hours after exposure.<br>Defatting dermatitis signs and symptoms may include a burning sensation and/or a dried/cracked appearance.  |
| <b>4.3 Indication of any immediate medical attention and special treatment needed</b> | : | Treat symptomatically.  |

---

### 5. FIRE FIGHTING MEASURES

Clear fire area of all non-emergency personnel.

- |                                       |   |  |
|---------------------------------------|---|--|
| <b>5.1 Extinguishing Media</b>        | : | Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.                 |
| <b>Unsuitable Extinguishing Media</b> | : | Do not use water in a jet. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam. |
| <b>5.2 Special hazards</b>            | : | Hazardous combustion products may include: A complex   |

## Safety Data Sheet

<b>arising from the substance or mixture</b>	mixture of airborne solid and liquid particulates and gases (smoke). Carbon monoxide. Oxides of sulphur. Unidentified organic and inorganic compounds. Carbon monoxide may be evolved if incomplete combustion occurs. Will float and can be reignited on surface water. Flammable vapours may be present even at temperatures below the flash point.
<b>5.3 Advice for firefighters</b>	: Wear full protective clothing and self-contained breathing apparatus.
<b>Additional Advice</b>	: Keep adjacent containers cool by spraying with water.

## 6. ACCIDENTAL RELEASE MEASURES

Avoid contact with spilled or released material. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. See Chapter 13 for information on disposal. Observe the relevant local and international regulations. Evacuate the area of all non-essential personnel. Ventilate contaminated area thoroughly.

<b>6.1 Personal Precautions, Protective Equipment and Emergency Procedures</b>	: Do not breathe fumes, vapour. Do not operate electrical equipment.
<b>6.2 Environmental Precautions</b>	: Shut off leaks, if possible without personal risks. Remove all possible sources of ignition in the surrounding area. Use appropriate containment (of product and fire fighting water) to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers. Attempt to disperse the vapour or to direct its flow to a safe location for example by using fog sprays. Take precautionary measures against static discharge. Ensure electrical continuity by bonding and grounding (earthing) all equipment.
<b>6.3 Methods and Material for Containment and Clean Up</b>	: For large liquid spills (> 1 drum), transfer by mechanical means such as vacuum truck to a salvage tank for recovery or safe disposal. Do not flush away residues with water. Retain as contaminated waste. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely. For small liquid spills (< 1 drum), transfer by mechanical means to a labelled, sealable container for product recovery or safe disposal. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely. Shovel into a suitable clearly marked container for disposal or reclamation in accordance with local regulations.
<b>Additional Advice</b>	: Notify authorities if any exposure to the general public or the environment occurs or is likely to occur. Local authorities

## Safety Data Sheet

### 6.4 Reference to other sections

should be advised if significant spillages cannot be contained. Maritime spillages should be dealt with using a Shipboard Oil Pollution Emergency Plan (SOPEP), as required by MARPOL Annex 1 Regulation 26.

: For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. For guidance on disposal of spilled material see Chapter 13 of this Material Safety Data Sheet.

## 7. HANDLING AND STORAGE

### General Precautions

: Avoid breathing vapours or contact with material. Only use in well ventilated areas. Wash thoroughly after handling. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material. Air-dry contaminated clothing in a well-ventilated area before laundering. Properly dispose of any contaminated rags or cleaning materials in order to prevent fires. Prevent spillages. Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols. Never siphon by mouth. Contaminated leather articles including shoes cannot be decontaminated and should be destroyed to prevent reuse. For comprehensive advice on handling, product transfer, storage and tank cleaning refer to the product supplier.

### 7.1 Precautions for Safe Handling

: Avoid inhaling vapour and/or mists. Electrostatic charges may be generated during pumping. Electrostatic discharge may cause fire. Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks. Earth all equipment. Avoid prolonged or repeated contact with skin. When using do not eat or drink. The vapour is heavier than air, spreads along the ground and distant ignition is possible.

### 7.2 Conditions for safe storage, including any incompatibilities

: Tank storage: Tanks must be specifically designed for use with this product. Bulk storage tanks should be diked (bunded). Locate tanks away from heat and other sources of ignition. Must be stored in a diked (bunded) well-ventilated area, away from sunlight, ignition sources and other sources of heat. The vapour is heavier than air. Beware of accumulation in pits and confined spaces.

Keep in a bunded area with a sealed (low permeability) floor, to provide containment against spillage. Prevent ingress of water.

### 7.3 Specific end use(s)

: Please refer to Ch16 and/or the annexes for the registered uses under REACH.

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- Additional Information** : Ensure that all local regulations regarding handling and storage facilities are followed.
- Product Transfer** : Avoid splash filling. Wait 2 minutes after tank filling (for tanks such as those on road tanker vehicles) before opening hatches or manholes. Wait 30 minutes after tank filling (for large storage tanks) before opening hatches or manholes. Keep containers closed when not in use. Do not use compressed air for filling, discharging or handling. Contamination resulting from product transfer may give rise to light hydrocarbon vapour in the headspace of tanks that have previously contained gasoline. This vapour may explode if there is a source of ignition. Partly filled containers present a greater hazard than those that are full, therefore handling, transfer and sampling activities need special care.
- Recommended Materials** : For containers, or container linings use mild steel, stainless steel.
- Unsuitable Materials** : Some synthetic materials may be unsuitable for containers or container linings depending on the material specification and intended use. Compatibility should be checked with the manufacturer.

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

If the American Conference of Governmental Industrial Hygienists (ACGIH) value is provided on this document, it is provided for information only.

Read in conjunction with the Exposure Scenario for your specific use contained in the Annex.

#### 8.1 Control Parameters

##### Occupational Exposure Limits

None established.

Material	Source	Type	ppm	mg/m3	Notation
Fuels, diesel, no.2	ACGIH	TWA(Inhalable fraction and vapor.)		100 mg/m3	as total hydrocarbons
	ACGIH	SKIN_DES(Inhalable fraction and vapor.)			Can be absorbed through the skin.as total hydrocarbons

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Material	Source	Hazard Designation
Fuels, diesel, no.2	ACGIH	Confirmed animal carcinogen with unknown relevance to humans.

**Biological Exposure Index (BEI)**

No biological limit allocated.

**Derived No Effect Levels (DNEL/DMEL) Table**

Component	Exposure Route	Exposure Type (long/short)	Application Area	Value
Fuels, diesel	Inhalation	acute, systemic effects	Worker	4300 mg/m <sup>3</sup> /15 mins (aerosol)
	Dermal	long term, systemic effects	Worker	2,9 mg/kg 8h
	Inhalation	long term, systemic effects	Worker	68 mg/m <sup>3</sup> /8h (aerosol)
	Inhalation	acute, systemic effects	Consumer	2600 mg/m <sup>3</sup> /15 mins (aerosol)
	Dermal	long term, systemic effects	Consumer	1,3 mg/kg 24h
	Inhalation	long term, local effects	Consumer	20 mg/m <sup>3</sup> /24h (aerosol)

**PNEC related information** : Substance is a hydrocarbon with a complex, unknown or variable composition. Conventional methods of deriving PNECs are not appropriate and it is not possible to identify a



## Safety Data Sheet

single representative PNEC for such substances.

### 8.2 Exposure Controls

#### General Information

: The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include: Use sealed systems as far as possible. Adequate ventilation to control airborne concentrations below the exposure guidelines/limits. Local exhaust ventilation is recommended. Eye washes and showers for emergency use.

Do not ingest. If swallowed then seek immediate medical assistance.

#### Occupational Exposure Controls

##### Personal Protective Equipment

: Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.

##### Eye Protection

: Chemical splash goggles (chemical monogoggles). Approved to EU Standard EN166.

##### Hand Protection

: Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, glove thickness, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced. Select gloves tested to a relevant standard (e.g. Europe EN374 for chemical resistance and EN407 for heat resistance).

##### Body protection

: Chemical resistant gloves/gauntlets, boots, and apron (where risk of splashing).

##### Respiratory Protection

: If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Check with respiratory protective equipment suppliers. Where air-filtering respirators are unsuitable (e.g. airborne concentrations are high, risk of oxygen deficiency, confined space) use appropriate positive pressure breathing apparatus. All respiratory protection equipment and use must be in accordance with local regulations. Select a filter suitable for organic gases and vapours [boiling point >65 °C (149 °F)]

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<b>Thermal Hazards</b>	: meeting EN14387. : Not applicable.
<b>Monitoring Methods</b>	: Monitoring of the concentration of substances in the breathing zone of workers or in the general workplace may be required to confirm compliance with an OEL and adequacy of exposure controls. For some substances biological monitoring may also be appropriate.
<b>Environmental Exposure Controls</b>	
<b>Environmental exposure control measures</b>	: Local guidelines on emission limits for volatile substances must be observed for the discharge of exhaust air containing vapour.
<b>Consumer Exposure Controls</b>	
<b>Exposure Control Measures for Consumers</b>	: If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374 and provide employee skin care programmes.

**9. PHYSICAL AND CHEMICAL PROPERTIES****9.1 Information on basic physical and chemical properties**

Appearance	: Clear amber. Liquid.
Odour	: Hydrocarbon.
Odour threshold	: Data not available
pH	: Not applicable.
Initial Boiling Point and Boiling Range	: ca. 174 - 384 °C / 345 - 723 °F
Melting / freezing point	: Data not available
Pour point	: -25 - -15 °C / -13 - 5 °F
Flash point	: > 55 °C / 131 °F
Upper / lower Flammability or Explosion limits	: 0,6 - 7,5 %(V)
Ignition temperature	: 225 - 230 °C / 437 - 446 °F
Vapour pressure	: 4 hPa
Specific gravity	: Data not available
Density	: 0,809 - 0,875 g/cm <sup>3</sup> at 15 °C / 59 °F
Bulk density	: Data not available
Water solubility	: Negligible.
Solubility in other solvents	: Data not available
n-octanol/water partition coefficient (log Pow)	: 2,66 - 6,0
Dynamic viscosity	: Data not available
Kinematic viscosity	: 1,5 - 4,5 mm <sup>2</sup> /s at 40 °C / 104 °F

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Vapour density (air=1) : Data not available  
Evaporation rate (nBuAc=1) : Data not available  
Flammability : Data not available

### 9.2 Other Information

Other Information : Data not available

---

## 10. STABILITY AND REACTIVITY

**10.1 Reactivity** : Stable under normal conditions of use.  
**10.2 Chemical stability** : Stable under normal conditions of use.  
**10.3 Possibility of Hazardous Reactions** : Data not available  
**10.4 Conditions to Avoid** : Avoid heat, sparks, open flames and other ignition sources.  
**10.5 Incompatible Materials** : Strong oxidising agents.  
**10.6 Hazardous Decomposition Products** : Hazardous decomposition products are not expected to form during normal storage. Thermal decomposition is highly dependent on conditions. A complex mixture of airborne solids, liquids and gases, including carbon monoxide, carbon dioxide and other organic compounds will be evolved when this material undergoes combustion or thermal or oxidative degradation.

---

## 11. TOXICOLOGICAL INFORMATION

### 11.1 Information on Toxicological effects

**Basis for Assessment** : Information given is based on product data, a knowledge of the components and the toxicology of similar products.  
**Likely Routes of Exposure** : Skin and eye contact are the primary routes of exposure although exposure may occur through inhalation or following accidental ingestion.  
**Acute Oral Toxicity** : Low toxicity: LD50 > 5000 mg/kg , Rat  
**Acute Dermal Toxicity** : LD50 >2000 mg/kg , Rabbit  
**Acute Inhalation Toxicity** : Harmful if inhaled. LC50 > 1.0 - <= 5.0 mg/l / 4 h, Rat  
**Skin corrosion/irritation** : Irritating to skin.  
**Serious eye damage/irritation** : Expected to be slightly irritating.  
**Respiratory Irritation** : Inhalation of vapours or mists may cause irritation to the respiratory system.

**Safety Data Sheet**

<b>Respiratory or skin sensitisation</b>	: Not expected to be a sensitiser.
<b>Aspiration Hazard</b>	: Aspiration into the lungs when swallowed or vomited may cause chemical pneumonitis which can be fatal.
<b>Germ cell mutagenicity</b>	: Positive in in-vitro, but negative in in-vivo mutagenicity assays.
<b>Carcinogenicity</b>	: Limited evidence of carcinogenic effect. Repeated skin contact has resulted in irritation and skin cancer in animals.
<b>Reproductive and Developmental Toxicity</b>	: Not expected to be a developmental toxicant. Not expected to impair fertility.
<b>Specific target organ toxicity - single exposure</b>	: Not classified.
<b>Specific target organ toxicity - repeated exposure</b>	: May cause damage to organs or organ systems through prolonged or repeated exposure. Blood. Thymus. Liver.

**12. ECOLOGICAL INFORMATION**

<b>Basis for Assessment</b>	: Information given is based on a knowledge of the components and the ecotoxicology of similar products.
<b>12.1 Toxicity</b>	
<b>Acute Toxicity</b>	: Expected to be toxic: LL/EL/IL50 1-10 mg/l LL/EL50 expressed as the nominal amount of product required to prepare aqueous test extract.
<b>Fish</b>	: Expected to be toxic: LL/EL/IL50 1-10 mg/l
<b>Aquatic crustacea</b>	: Expected to be toxic: LL/EL/IL50 1-10 mg/l
<b>Algae/aquatic plants</b>	: Expected to be toxic: LL/EL/IL50 1-10 mg/l
<b>Microorganisms</b>	: Expected to be practically non toxic: LL/EL/IL50 > 100 mg/l
<b>Chronic Toxicity</b>	
<b>Fish</b>	: NOEC/NOEL expected to be > 0.01 - <= 0.1 mg/l (based on modeled data)
<b>Aquatic crustacea</b>	: NOEC/NOEL expected to be > 0.1 - <= 1.0 mg/l (based on modeled data)
<b>12.2 Persistence and degradability</b>	: Readily biodegradable. Persistent per IMO criteria. International Oil Pollution Compensation (IOPC) Fund definition: "A non-persistent oil is oil, which, at the time of shipment, consists of hydrocarbon fractions, (a) at least 50% of which, by volume, distills at a temperature of 340°C (645°F) and (b) at least 95% of which, by volume, distills at a temperature of 370°C (700°F) when tested by the ASTM Method D-86/78 or any subsequent revision thereof."
<b>12.3 Bioaccumulative Potential</b>	: Contains constituents with the potential to bioaccumulate.

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- 12.4 Mobility** : Partly evaporates from water or soil surfaces, but a significant proportion will remain after one day. If product enters soil, one or more constituents will be mobile and may contaminate groundwater. Floats on water. Large volumes may penetrate soil and could contaminate groundwater.
- 12.5 Result of PBT and vPvB assesment** : The substance does not fulfill all screening criteria for persistence, bioaccumulation and toxicity and hence is not considered to be PBT or vPvB.
- 12.6 Other Adverse Effects** : Films formed on water may affect oxygen transfer and damage organisms.

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### 13. DISPOSAL CONSIDERATIONS

#### 13.1 Waste Treatment Methods

- Material Disposal** : Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations. Do not dispose into the environment, in drains or in water courses. Do not dispose of tank water bottoms by allowing them to drain into the ground. This will result in soil and groundwater contamination. Waste arising from a spillage or tank cleaning should be disposed of in accordance with prevailing regulations, preferably to a recognised collector or contractor. The competence of the collector or contractor should be established beforehand.
- Local Legislation** : EU Waste Disposal Code (EWC): 13 07 01 fuel oil and diesel. Disposal should be in accordance with applicable regional, national, and local laws and regulations. Local regulations may be more stringent than regional or national requirements and must be complied with.

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### 14. TRANSPORT INFORMATION

**Land transport (ADR/RID):**  
**ADR**

- 14.1 UN number : 1202  
14.2 UN proper shipping name : GAS OIL

**Safety Data Sheet**

14.3 Transport hazard : 3  
 class(es)  
 14.4 Packing group : III  
 Danger label (primary risk) : 3  
 14.5 Environmental : Environmentally Hazardous  
 hazards  
 14.6 Special precautions for user : Special Precautions: Refer to Chapter 7, Handling & Storage, for special precautions which a user needs to be aware of or needs to comply with in connection with transport.

**RID**

14.1 UN number : 1202  
 14.2 UN proper shipping name : GAS OIL  
 14.3 Transport hazard : 3  
 class(es)  
 14.4 Packing group : III  
 Danger label (primary risk) : 3  
 14.5 Environmental : Environmentally Hazardous  
 hazards  
 14.6 Special precautions for user : Special Precautions: Refer to Chapter 7, Handling & Storage, for special precautions which a user needs to be aware of or needs to comply with in connection with transport.

**Inland waterways transport (ADN):**

14.1 UN number : 1202  
 14.2 UN proper shipping name : GAS OIL  
 14.3 Transport hazard : 3  
 class(es)  
 14.4 Packing group : III  
 Danger label (primary risk) : 3  
 Danger label (subsidiary risk) : N2  
 F  
 14.5 Environmental : Environmentally Hazardous  
 hazards  
 14.6 Special precautions for user : Special Precautions: Refer to Chapter 7, Handling & Storage, for special precautions which a user needs to be aware of or needs to comply with in connection with transport.

**Sea transport (IMDG Code):**

14.1 UN number : UN 1202  
 14.2 UN proper shipping name : GAS OIL

**Safety Data Sheet**

14.3 Transport hazard class(es) : 3  
14.4 Packing group : III  
14.5 Marine pollutant : Yes  
  
14.6 Special precautions for user : Special Precautions: Refer to Chapter 7, Handling & Storage, for special precautions which a user needs to be aware of or needs to comply with in connection with transport.

**Air transport (IATA):**

14.1 UN number : 1202  
14.2 UN proper shipping name : Gas oil  
14.3 Transport hazard class(es) : 3  
14.4 Packing group : III  
14.6 Special precautions for user : Special Precautions: Refer to Chapter 7, Handling & Storage, for special precautions which a user needs to be aware of or needs to comply with in connection with transport.

**14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code**

Pollution Category : Not applicable.  
Ship Type : Not applicable.  
Product Name : Not applicable.  
Special Precaution : Not applicable.

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**15. REGULATORY INFORMATION**

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

**15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture****Other regulatory Information**

**15.2 Chemical Safety Assessment** : A Chemical Safety Assessment was performed for this substance.

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**16. OTHER INFORMATION****R-phrases(s)**



**Safety Data Sheet**

R20	Harmful by inhalation.
R38	Irritating to skin.
R40	Limited evidence of carcinogenic effect.
R51/53	Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R65	Harmful: may cause lung damage if swallowed.

**CLP Hazard Statements**

H226	Flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H332	Harmful if inhaled.
H351	Suspected of causing cancer.
H373	May cause damage to organs or organ systems through prolonged or repeated exposure.
H411	Toxic to aquatic life with long lasting effects.

**Identified Uses according to the Use Descriptor System****Uses - Worker**

Title : Manufacture of substance  
- Industrial

**Uses - Worker**

Title : Use as an intermediate  
- Industrial

**Uses - Worker**

Title : Distribution of substance  
- Industrial

**Uses - Worker**

Title : Formulation & (re)packing of substances and mixtures  
- Industrial

**Uses - Worker**

Title : Use as a fuel  
- Industrial

**Uses - Worker**

Title : Use as a fuel  
- Professional

**Uses - Consumer**

**Safety Data Sheet**

<b>Title</b>	:	Use as a fuel - Consumer
<b>Recommended Restrictions on Use (Advice Against)</b>	:	This product must not be used in applications other than those recommended in Section 1, without first seeking the advice of the supplier. This product is not to be used as a solvent or cleaning agent; for lighting or brightening fires; as a skin cleanser.
<b>Additional Information</b>	:	This document contains important information to ensure the safe storage, handling and use of this product. The information in this document should be brought to the attention of the person in your organisation responsible for advising on safety matters.
<b>Other Information</b>		
<b>Further Information</b>	:	This product is intended for use in closed systems only.
<b>MSDS Distribution</b>	:	The information in this document should be made available to all who may handle the product.
<b>MSDS Version Number</b>	:	1.1
<b>MSDS Effective Date</b>	:	01.08.2012
<b>MSDS Revisions</b>	:	A vertical bar ( ) in the left margin indicates an amendment from the previous version.
<b>MSDS Regulation</b>	:	Regulation 1907/2006/EC
<b>Disclaimer</b>	:	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

## Exposure Scenario - Worker

Gas Oils (vacuum,hydrocracked and distillate fuels)	
<b>SECTION 1</b>	<b>EXPOSURE SCENARIO TITLE</b>
<b>Title</b>	Manufacture of substance - Industrial
<b>Use Descriptor</b>	<b>Sector of Use:</b> SU 3, SU8, SU9 <b>Process Categories:</b> PROC 1, PROC 2, PROC 3, PROC 4, PROC 8a, PROC 8b, PROC 15 <b>Environmental Release Categories:</b> ERC 1, ERC 4, ESVOC SpERC 1.1.v1
<b>Scope of process</b>	Manufacture of the substance or use as a process chemical or extraction agent. Includes recycling/ recovery, material transfers, storage, maintenance and loading (including marine vessel/barge, road/rail car and bulk container), sampling and associated laboratory activities.

<b>SECTION 2</b>	<b>OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES</b>
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<b>Section 2.1</b>	<b>Control of Worker Exposure</b>
<b>Product Characteristics</b>	
Physical form of product	Liquid, vapour pressure < 0.5 kPa at STP
Concentration of substance in product.	Covers use of substance/product up to 100% (unless stated differently).,
<b>Frequency and Duration of Use</b>	
Covers daily exposures up to 8 hours (unless stated differently).	
<b>Other Operational Conditions affecting Exposure</b>	
Operation is carried out at elevated temperature (> 20°C above ambient temperature). Assumes a good basic standard of occupational hygiene has been implemented.	

<b>Contributing Scenarios</b>	<b>Risk Management Measures</b>
General measures applicable to all activities.	Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff

**Safety Data Sheet**

	are informed of exposure potential and aware of basic actions to minimise exposures; ensure suitable personal protective equipment is available; clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; provide regular health surveillance as appropriate; identify and implement corrective actions.
General measures (skin irritants).	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.
General exposures (closed systems).	No other specific measures identified.
General exposures (open systems).	Wear suitable gloves tested to EN374.
Process sampling.	No other specific measures identified.
Bulk closed loading and unloading.	Wear suitable gloves tested to EN374.
Bulk open loading and unloading.	Wear suitable gloves tested to EN374.
Equipment cleaning and maintenance.	Drain down system prior to equipment break-in or maintenance. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Laboratory activities.	No other specific measures identified.
Bulk product storage.	Store substance within a closed system.

<b>Section 2.2</b>	<b>Control of Environmental Exposure</b>
Substance is complex UVCB.	
Predominantly hydrophobic.	
<b>Amounts Used</b>	
Fraction of EU tonnage used in region:	0,1
Regional use tonnage (tonnes/year):	2,8E+07
Fraction of Regional tonnage used locally:	0,021
Annual site tonnage (tonnes/year):	6,0E+05

## Safety Data Sheet

Maximum daily site tonnage (kg/day):	2,0E+06
<b>Frequency and Duration of Use</b>	
Continuous release.	
Emission Days (days/year):	300
<b>Environmental factors not influenced by risk management</b>	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
<b>Other Operational Conditions affecting Environmental Exposure</b>	
Release fraction to air from process (initial release prior to RMM):	1,0E-02
Release fraction to wastewater from process (initial release prior to RMM):	3,0E-05
Release fraction to soil from process (initial release prior to RMM):	1,0E-04
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Common practices vary across sites thus conservative process release estimates used.	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Risk from environmental exposure is driven by freshwater sediment.	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
Treat air emission to provide a typical removal efficiency of (%)	90
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	90,3
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%)	0
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
<b>Organisational measures to prevent/limit release from site</b>	
Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.	
<b>Conditions and Measures related to municipal sewage treatment plant</b>	
Estimated substance removal from wastewater via domestic sewage treatment (%)	94,1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94,1
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	3,3E+06
Assumed domestic sewage treatment plant flow (m3/d)	10.000
<b>Conditions and Measures related to external treatment of waste for disposal</b>	
During manufacturing no waste of the substance is generated.	
<b>Conditions and measures related to external recovery of waste</b>	

**Safety Data Sheet**

During manufacturing no waste of the substance is generated.

**SECTION 3****EXPOSURE ESTIMATION****Section 3.1 - Health**

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

**Section 3.2 - Environment**

The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

**SECTION 4****GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO****Section 4.1 - Health**

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.  
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.  
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.  
Risk Management Measures are based on qualitative risk characterisation.

**Section 4.2 -Environment**

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org>).

## Safety Data Sheet

## Exposure Scenario - Worker

Gas Oils(vacuum,hydrocracked and distillate fuels)	
<b>SECTION 1</b>	<b>EXPOSURE SCENARIO TITLE</b>
<b>Title</b>	Use as an intermediate - Industrial
<b>Use Descriptor</b>	<b>Sector of Use:</b> SU 3, SU8, SU9 <b>Process Categories:</b> PROC 1, PROC 2, PROC 3, PROC 4, PROC 8a, PROC 8b, PROC 15 <b>Environmental Release Categories:</b> ERC 6A, ESVOC SpERC 6.1a.v1
<b>Scope of process</b>	Use of substance as an intermediate (not related to Strictly Controlled Conditions). Includes recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container).

<b>SECTION 2</b>	<b>OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES</b>
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<b>Section 2.1</b>	<b>Control of Worker Exposure</b>
<b>Product Characteristics</b>	
Physical form of product	Liquid, vapour pressure < 0.5 kPa at STP
Concentration of substance in product.	Covers use of substance/product up to 100% (unless stated differently).,
<b>Frequency and Duration of Use</b>	
Covers daily exposures up to 8 hours (unless stated differently).	
<b>Other Operational Conditions affecting Exposure</b>	
Operation is carried out at elevated temperature (> 20°C above ambient temperature). Assumes a good basic standard of occupational hygiene has been implemented.	

<b>Contributing Scenarios</b>	<b>Risk Management Measures</b>
General measures applicable to all activities.	Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff



**Safety Data Sheet**

	are informed of exposure potential and aware of basic actions to minimise exposures; ensure suitable personal protective equipment is available; clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; provide regular health surveillance as appropriate; identify and implement corrective actions.
General measures (skin irritants).	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.
General exposures (closed systems).	No other specific measures identified.
General exposures (open systems).	Wear suitable gloves tested to EN374.
Process sampling.	No other specific measures identified.
Bulk closed loading and unloading.	Wear suitable gloves tested to EN374.
Bulk open loading and unloading.	Wear suitable gloves tested to EN374.
Equipment cleaning and maintenance.	Drain down system prior to equipment break-in or maintenance. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Laboratory activities.	No other specific measures identified.
Bulk product storage.	Store substance within a closed system.

<b>Section 2.2</b>	<b>Control of Environmental Exposure</b>
Substance is complex UVCB.	
Predominantly hydrophobic.	
<b>Amounts Used</b>	
Fraction of EU tonnage used in region:	0,1
Regional use tonnage (tonnes/year):	3,5E+05
Fraction of Regional tonnage used locally:	0,043
Annual site tonnage (tonnes/year):	1,5E+04

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Maximum daily site tonnage (kg/day):	5,0E+04
<b>Frequency and Duration of Use</b>	
Continuous release.	
Emission Days (days/year):	300
<b>Environmental factors not influenced by risk management</b>	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
<b>Other Operational Conditions affecting Environmental Exposure</b>	
Release fraction to air from process (initial release prior to RMM):	1,0E-03
Release fraction to wastewater from process (initial release prior to RMM):	3,0E-05
Release fraction to soil from process (initial release prior to RMM):	1,0E-03
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Common practices vary across sites thus conservative process release estimates used.	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Risk from environmental exposure is driven by freshwater sediment.	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	80
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	51,7
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%)	0
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
<b>Organisational measures to prevent/limit release from site</b>	
Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.	
<b>Conditions and Measures related to municipal sewage treatment plant</b>	
Estimated substance removal from wastewater via domestic sewage treatment (%)	94,1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94,1
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	4,1E+05
Assumed domestic sewage treatment plant flow (m3/d)	2.000
<b>Conditions and Measures related to external treatment of waste for disposal</b>	
This substance is consumed during use and no waste of substance is generated.	

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<b>Conditions and measures related to external recovery of waste</b>
This substance is consumed during use and no waste of substance is generated.

<b>SECTION 3</b>	<b>EXPOSURE ESTIMATION</b>
<b>Section 3.1 - Health</b>	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

<b>Section 3.2 - Environment</b>	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.	

<b>SECTION 4</b>	<b>GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO</b>
<b>Section 4.1 - Health</b>	
<p>Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.</p> <p>Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.</p> <p>Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.</p> <p>Risk Management Measures are based on qualitative risk characterisation.</p>	

<b>Section 4.2 -Environment</b>	
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.	
Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.	
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.	
Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org">http://cefic.org</a> ).	

## Safety Data Sheet

## Exposure Scenario - Worker

Gas Oils(vacuum,hydrocracked and distillate fuels)	
<b>SECTION 1</b>	<b>EXPOSURE SCENARIO TITLE</b>
<b>Title</b>	Distribution of substance - Industrial
<b>Use Descriptor</b>	<b>Sector of Use:</b> SU 3 <b>Process Categories:</b> PROC 1, PROC 2, PROC 3, PROC 4, PROC 8a, PROC 8b, PROC 9, PROC 15 <b>Environmental Release Categories:</b> ERC 1, ERC 2, ERC 3, ERC 4, ERC 5, ERC 6A, ERC 6B, ERC 6C, ERC 6D, ERC 7, ESVOC SpERC 1.1b.v1
<b>Scope of process</b>	Loading (including marine vessel/barge, rail/road car and IBC loading) and repacking (including drums and small packs) of substance, including its sampling, storage, unloading distribution and associated laboratory activities.

<b>SECTION 2</b>	<b>OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES</b>
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<b>Section 2.1</b>	<b>Control of Worker Exposure</b>
<b>Product Characteristics</b>	
Physical form of product	Liquid, vapour pressure < 0.5 kPa at STP
Concentration of substance in product.	Covers use of substance/product up to 100% (unless stated differently).,
<b>Frequency and Duration of Use</b>	
Covers daily exposures up to 8 hours (unless stated differently).	
<b>Other Operational Conditions affecting Exposure</b>	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene has been implemented.	

<b>Contributing Scenarios</b>	<b>Risk Management Measures</b>
General measures applicable to all activities.	Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff

## Safety Data Sheet

	are informed of exposure potential and aware of basic actions to minimise exposures; ensure suitable personal protective equipment is available; clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; provide regular health surveillance as appropriate; identify and implement corrective actions.
General measures (skin irritants).	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.
General exposures (closed systems).	No other specific measures identified.
General exposures (open systems).	Wear suitable gloves tested to EN374.
Process sampling.	No other specific measures identified.
Laboratory activities.	No other specific measures identified.
Bulk closed loading and unloading.	Wear suitable gloves tested to EN374.
Bulk open loading and unloading.	Wear suitable gloves tested to EN374.
Drum and small package filling.	Wear suitable gloves tested to EN374.
Equipment cleaning and maintenance.	Drain down system prior to equipment break-in or maintenance. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Storage.	Store substance within a closed system.

<b>Section 2.2</b>	<b>Control of Environmental Exposure</b>
Substance is complex UVCB.	
Predominantly hydrophobic.	
<b>Amounts Used</b>	
Fraction of EU tonnage used in region:	0,1
Regional use tonnage (tonnes/year):	2,8E+07

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Fraction of Regional tonnage used locally:	0,002
Annual site tonnage (tonnes/year):	5,6E+04
Maximum daily site tonnage (kg/day):	1,9E+05
<b>Frequency and Duration of Use</b>	
Continuous release.	
Emission Days (days/year):	300
<b>Environmental factors not influenced by risk management</b>	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
<b>Other Operational Conditions affecting Environmental Exposure</b>	
Release fraction to air from process (initial release prior to RMM):	1,0E-03
Release fraction to wastewater from process (initial release prior to RMM):	1,0E-06
Release fraction to soil from process (initial release prior to RMM):	1,0E-05
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Common practices vary across sites thus conservative process release estimates used.	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Risk from environmental exposure is driven by freshwater sediment.	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	90
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	9,6
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%)	0
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
<b>Organisational measures to prevent/limit release from site</b>	
Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.	
<b>Conditions and Measures related to municipal sewage treatment plant</b>	
Estimated substance removal from wastewater via domestic sewage treatment (%)	94,1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94,1
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	2,9E+06
Assumed domestic sewage treatment plant flow (m3/d)	2.000

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<b>Conditions and Measures related to external treatment of waste for disposal</b>
External treatment and disposal of waste should comply with applicable local and/or regional regulations.
<b>Conditions and measures related to external recovery of waste</b>
External recovery and recycling of waste should comply with applicable local and/or regional regulations.

<b>SECTION 3</b>	<b>EXPOSURE ESTIMATION</b>
<b>Section 3.1 - Health</b>	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

<b>Section 3.2 - Environment</b>
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

<b>SECTION 4</b>	<b>GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO</b>
<b>Section 4.1 - Health</b>	
<p>Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.</p> <p>Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.</p> <p>Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.</p> <p>Risk Management Measures are based on qualitative risk characterisation.</p>	

<b>Section 4.2 -Environment</b>
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org">http://cefic.org</a> ).



## Safety Data Sheet

## Exposure Scenario - Worker

Gas Oils(vacuum,hydrocracked and distillate fuels)	
<b>SECTION 1</b>	<b>EXPOSURE SCENARIO TITLE</b>
<b>Title</b>	Formulation & (re)packing of substances and mixtures - Industrial
<b>Use Descriptor</b>	<b>Sector of Use:</b> SU 3, SU 10 <b>Process Categories:</b> PROC 1, PROC 2, PROC 3, PROC 4, PROC 5, PROC 8a, PROC 8b, PROC 9, PROC 14, PROC 15 <b>Environmental Release Categories:</b> ERC 2, ESVOC SpERC 2.2.v1
<b>Scope of process</b>	Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tableting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities.

<b>SECTION 2</b>	<b>OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES</b>
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<b>Section 2.1</b>	<b>Control of Worker Exposure</b>
<b>Product Characteristics</b>	
Physical form of product	Liquid, vapour pressure < 0.5 kPa at STP
Concentration of substance in product.	Covers use of substance/product up to 100% (unless stated differently).,
<b>Frequency and Duration of Use</b>	
Covers daily exposures up to 8 hours (unless stated differently).	
<b>Other Operational Conditions affecting Exposure</b>	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene has been implemented.	

<b>Contributing Scenarios</b>	<b>Risk Management Measures</b>
General measures applicable to all activities.	Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance.

## Safety Data Sheet

	Where there is potential for exposure: Ensure relevant staff are informed of exposure potential and aware of basic actions to minimise exposures; ensure suitable personal protective equipment is available; clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; provide regular health surveillance as appropriate; identify and implement corrective actions.
General measures (skin irritants).	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.
General exposures (closed systems).	No other specific measures identified.
General exposures (open systems).	Wear suitable gloves tested to EN374.
Process sampling.	No other specific measures identified.
Drum/batch transfers.	Use drum pumps or carefully pour from container. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Bulk transfers.	Handle substance within a closed system. Wear suitable gloves tested to EN374.
Mixing operations (open systems).	Provide extract ventilation to points where emissions occur. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Production or preparation or articles by tableting, compression, extrusion or pelletisation.	Wear suitable gloves tested to EN374.
Drum/batch transfers.	Wear suitable gloves tested to EN374.
Laboratory activities.	No other specific measures identified.
Equipment cleaning and maintenance.	Drain down system prior to equipment break-in or maintenance.

## Safety Data Sheet

	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Storage.	Store substance within a closed system.

<b>Section 2.2</b>	<b>Control of Environmental Exposure</b>
Substance is complex UVCB.	
Predominantly hydrophobic.	
<b>Amounts Used</b>	
Fraction of EU tonnage used in region:	0,1
Regional use tonnage (tonnes/year):	2,8E+07
Fraction of Regional tonnage used locally:	0,0011
Annual site tonnage (tonnes/year):	3,0E+04
Maximum daily site tonnage (kg/day):	1,0E+05
<b>Frequency and Duration of Use</b>	
Continuous release.	
Emission Days (days/year):	300
<b>Environmental factors not influenced by risk management</b>	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
<b>Other Operational Conditions affecting Environmental Exposure</b>	
Release fraction to air from process (after typical onsite RMMs consistent with EU Solvent Emissions Directive requirements):	1,0E-02
Release fraction to wastewater from process (initial release prior to RMM):	2,0E-05
Release fraction to soil from process (initial release prior to RMM):	1,0E-04
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Common practices vary across sites thus conservative process release estimates used.	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Risk from environmental exposure is driven by freshwater sediment.	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	60,0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%)	0
Prevent discharge of undissolved substance to or recover from onsite	

**Safety Data Sheet**

wastewater.	
<b>Organisational measures to prevent/limit release from site</b>	
Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.	
<b>Conditions and Measures related to municipal sewage treatment plant</b>	
Estimated substance removal from wastewater via domestic sewage treatment (%)	94,1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94,1
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	6,8E+05
Assumed domestic sewage treatment plant flow (m3/d)	2.000
<b>Conditions and Measures related to external treatment of waste for disposal</b>	
External treatment and disposal of waste should comply with applicable local and/or regional regulations.	
<b>Conditions and measures related to external recovery of waste</b>	
External recovery and recycling of waste should comply with applicable local and/or regional regulations.	

<b>SECTION 3</b>	<b>EXPOSURE ESTIMATION</b>
<b>Section 3.1 - Health</b>	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

<b>Section 3.2 - Environment</b>	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.	

<b>SECTION 4</b>	<b>GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO</b>
<b>Section 4.1 - Health</b>	
<p>Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.</p> <p>Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.</p> <p>Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.</p> <p>Risk Management Measures are based on qualitative risk characterisation.</p>	

**Safety Data Sheet****Section 4.2 -Environment**

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org>).

## Safety Data Sheet

## Exposure Scenario - Worker

Gas Oils(vacuum,hydrocracked and distillate fuels)	
<b>SECTION 1</b>	<b>EXPOSURE SCENARIO TITLE</b>
<b>Title</b>	Use as a fuel - Industrial
<b>Use Descriptor</b>	<b>Sector of Use:</b> SU 3 <b>Process Categories:</b> PROC 1, PROC 2, PROC 3, PROC 8a, PROC 8b, PROC 16 <b>Environmental Release Categories:</b> ERC 7, ESVOC SpERC 7.12a.v1
<b>Scope of process</b>	Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.

<b>SECTION 2</b>	<b>OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES</b>
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<b>Section 2.1</b>	<b>Control of Worker Exposure</b>
<b>Product Characteristics</b>	
Physical form of product	Liquid, vapour pressure < 0.5 kPa at STP
Concentration of substance in product.	Covers use of substance/product up to 100% (unless stated differently).,
<b>Frequency and Duration of Use</b>	
Covers daily exposures up to 8 hours (unless stated differently).	
<b>Other Operational Conditions affecting Exposure</b>	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene has been implemented.	

<b>Contributing Scenarios</b>	<b>Risk Management Measures</b>
General measures applicable to all activities.	Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of exposure potential and aware of basic actions to minimise exposures; ensure suitable personal protective

## Safety Data Sheet

	equipment is available; clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; provide regular health surveillance as appropriate; identify and implement corrective actions.
General measures (skin irritants).	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.
Bulk transfers.	Wear suitable gloves tested to EN374.
Drum/batch transfers.	Wear suitable gloves tested to EN374.
Use as a fuel(closed systems).	No other specific measures identified.
Equipment cleaning and maintenance.	Drain down system prior to equipment break-in or maintenance. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Storage.	Handle substance within a closed system.

<b>Section 2.2</b>	<b>Control of Environmental Exposure</b>
Substance is complex UVCB.	
Predominantly hydrophobic.	
<b>Amounts Used</b>	
Fraction of EU tonnage used in region:	0,1
Regional use tonnage (tonnes/year):	4,5E+06
Fraction of Regional tonnage used locally:	0,34
Annual site tonnage (tonnes/year):	1,5E+06
Maximum daily site tonnage (kg/day):	5,0E+06
<b>Frequency and Duration of Use</b>	
Continuous release.	
Emission Days (days/year):	300
<b>Environmental factors not influenced by risk management</b>	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
<b>Other Operational Conditions affecting Environmental Exposure</b>	



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Release fraction to air from process (initial release prior to RMM):	5,0E-03
Release fraction to wastewater from process (initial release prior to RMM):	1,0E-05
Release fraction to soil from process (initial release prior to RMM):	0
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Common practices vary across sites thus conservative process release estimates used.	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Risk from environmental exposure is driven by freshwater sediment.	
Onsite waste water treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	95
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	97,7
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%)	60,4
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
<b>Organisational measures to prevent/limit release from site</b>	
Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.	
<b>Conditions and Measures related to municipal sewage treatment plant</b>	
Estimated substance removal from wastewater via domestic sewage treatment (%)	94,1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	97,7
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	5,5E+06
Assumed domestic sewage treatment plant flow (m3/d)	2.000
<b>Conditions and Measures related to external treatment of waste for disposal</b>	
Combustion emissions limited by required exhaust emission controls. Waste combustion emissions considered in regional exposure assessment.	
<b>Conditions and measures related to external recovery of waste</b>	
External recovery and recycling of waste should comply with applicable local and/or regional regulations.	

<b>SECTION 3</b>	<b>EXPOSURE ESTIMATION</b>
<b>Section 3.1 - Health</b>	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

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**Section 3.2 - Environment**

The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

**SECTION 4****GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO****Section 4.1 - Health**

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.  
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.  
Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.  
Risk Management Measures are based on qualitative risk characterisation.

**Section 4.2 -Environment**

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org>).

## Safety Data Sheet

## Exposure Scenario - Worker

Gas Oils(vacuum,hydrocracked and distillate fuels)	
<b>SECTION 1</b>	<b>EXPOSURE SCENARIO TITLE</b>
<b>Title</b>	Use as a fuel - Professional
<b>Use Descriptor</b>	<b>Sector of Use:</b> SU 22 <b>Process Categories:</b> PROC 1, PROC 2, PROC 3, PROC 8a, PROC 8b, PROC 16 <b>Environmental Release Categories:</b> ERC 9A, ERC 9B, ESVOC SpERC 9.12b.v1
<b>Scope of process</b>	Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.

<b>SECTION 2</b>	<b>OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES</b>
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<b>Section 2.1</b>	<b>Control of Worker Exposure</b>
<b>Product Characteristics</b>	
Physical form of product	Liquid, vapour pressure < 0.5 kPa at STP
Concentration of substance in product.	Covers use of substance/product up to 100% (unless stated differently).,
<b>Frequency and Duration of Use</b>	
Covers daily exposures up to 8 hours (unless stated differently).	
<b>Other Operational Conditions affecting Exposure</b>	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene has been implemented.	

<b>Contributing Scenarios</b>	<b>Risk Management Measures</b>
General measures applicable to all activities.	Control any potential exposure using measures such as contained systems, properly designed and maintained facilities and a good standard of general ventilation. Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Where there is potential for exposure: Ensure relevant staff are informed of exposure potential and aware of basic actions to minimise exposures; ensure suitable personal protective

**Safety Data Sheet**

	equipment is available; clear up spills and dispose of waste in accordance with regulatory requirements; monitor effectiveness of control measures; provide regular health surveillance as appropriate; identify and implement corrective actions.
General measures (skin irritants).	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.
Bulk transfers.	Wear suitable gloves tested to EN374.
Drum/batch transfers.	Wear suitable gloves tested to EN374.
Refueling.	Wear suitable gloves tested to EN374.
Use as a fuel(closed systems).	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). , or: Ensure operation is undertaken outdoors.
Equipment cleaning and maintenance.	Drain down system prior to equipment break-in or maintenance. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Storage.	Store substance within a closed system.

<b>Section 2.2</b>	<b>Control of Environmental Exposure</b>
Substance is complex UVCB.	
Predominantly hydrophobic.	
<b>Amounts Used</b>	
Fraction of EU tonnage used in region:	0,1
Regional use tonnage (tonnes/year):	6,7E+06
Fraction of Regional tonnage used locally:	0,0005
Annual site tonnage (tonnes/year):	3,3E+03
Maximum daily site tonnage (kg/day):	9,2E+03
<b>Frequency and Duration of Use</b>	
Continuous release.	

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Emission Days (days/year):	365
<b>Environmental factors not influenced by risk management</b>	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
<b>Other Operational Conditions affecting Environmental Exposure</b>	
Release fraction to air from process (initial release prior to RMM):	1,0E-04
Release fraction to wastewater from process (initial release prior to RMM):	1,0E-05
Release fraction to soil from process (initial release prior to RMM):	1,0E-05
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Common practices vary across sites thus conservative process release estimates used.	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Risk from environmental exposure is driven by freshwater sediment.	
If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of $\geq$ (%)	8,3
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%)	0
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
<b>Organisational measures to prevent/limit release from site</b>	
Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.	
<b>Conditions and Measures related to municipal sewage treatment plant</b>	
Estimated substance removal from wastewater via domestic sewage treatment (%)	94,1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	94,1
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	1,4E+05
Assumed domestic sewage treatment plant flow (m3/d)	2.000
<b>Conditions and Measures related to external treatment of waste for disposal</b>	
Combustion emissions limited by required exhaust emission controls. Waste combustion emissions considered in regional exposure assessment.	
<b>Conditions and measures related to external recovery of waste</b>	
External recovery and recycling of waste should comply with applicable local and/or regional regulations.	

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<b>SECTION 3</b>	<b>EXPOSURE ESTIMATION</b>
<b>Section 3.1 - Health</b>	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

<b>Section 3.2 - Environment</b>	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.	

<b>SECTION 4</b>	<b>GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO</b>
<b>Section 4.1 - Health</b>	
<p>Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.</p> <p>Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.</p> <p>Available hazard data do not enable the derivation of a DNEL for dermal irritant effects.</p> <p>Risk Management Measures are based on qualitative risk characterisation.</p>	

<b>Section 4.2 -Environment</b>	
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.	
Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.	
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.	
Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org">http://cefic.org</a> ).	

## Safety Data Sheet

## Exposure Scenario - Consumer

Gas Oils(vacuum,hydrocracked and distillate fuels)	
<b>SECTION 1</b>	<b>EXPOSURE SCENARIO TITLE</b>
<b>Title</b>	Use as a fuel - Consumer
<b>Use Descriptor</b>	<b>Sector of Use:</b> SU 21 <b>Product Categories:</b> PC13 <b>Environmental Release Categories:</b> ERC 9A, ERC 9B, ESVOC SpERC 9.12c.v1
<b>Scope of process</b>	Covers consumer uses in liquid fuels.

<b>SECTION 2</b>	<b>OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES</b>
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<b>Section 2.1</b>	<b>Control of Consumer Exposure</b>
<b>Product Characteristics</b>	
Physical form of product	Liquid, vapour pressure > 10 Pa at STP
Concentration of substance in product.	Unless otherwise stated:
	Covers concentrations up to 100 %
<b>Amounts Used</b>	
Unless otherwise stated:	
for each use event, covers amount up to (g):	37.500
covers skin contact area (cm2):	420
<b>Frequency and Duration of Use</b>	
Unless otherwise stated:	
covers use up to (times/day of use):	0,143
Covers use up to (hours/event):	2

<b>Product Categories</b>	<b>OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES</b>
Fuels. Liquid: Automotive Refuelling.	Covers concentration up to (%): 100 %
	Covers use up to (days/year): 52 day/year
	Covers use up to 1 times/day of use



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	covers skin contact area up to 210 cm <sup>2</sup>
	For each use event, covers amount up to 37.500 g.
	Covers outdoor use.
	Covers use in room size of 100 m <sup>3</sup>
	Covers exposure up to 0,05 hours/event
Fuels. Liquid, Garden Equipment - Use.	Covers concentrations up to 100 %
	covers use up to 26 day/year
	Covers use up to 1 times/day of use
	For each use event, covers amount up to 750 g.
	Covers outdoor use.
	Covers use in room size of 100 m <sup>3</sup>
	Covers exposure up to 2,00 hours/event
Fuels. Liquid: Garden Equipment - Refuelling.	Covers concentrations up to 100 %
	covers use up to 26 day/year
	Covers use up to 1 times/day of use
	covers skin contact area up to 420 cm <sup>2</sup>
	For each use event, covers amount up to 750 g.
	Covers use in a one car garage (34 m <sup>3</sup> ) under typical ventilation.
	Covers use in room size of 34 m <sup>3</sup>
	Covers exposure up to 0,03 hours/event

<b>Section 2.2</b>	<b>Control of Environmental Exposure</b>
Substance is complex UVCB.	
Predominantly hydrophobic.	
<b>Amounts Used</b>	
Fraction of EU tonnage used in region:	0,1
Regional use tonnage (tonnes/year):	1,6E+07
Fraction of Regional tonnage used locally:	0,0005
Annual site tonnage (tonnes/year):	8,2E+03
Maximum daily site tonnage (kg/day):	2,3E+04
<b>Frequency and Duration of Use</b>	
Continuous release.	
Emission Days (days/year):	365
<b>Environmental factors not influenced by risk management</b>	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
<b>Other Operational Conditions affecting Environmental Exposure</b>	
Release fraction to air from wide dispersive use (regional only):	1,0E-04
Release fraction to wastewater from wide dispersive use:	1,0E-05
Release fraction to soil from wide dispersive use (regional only):	1,0E-05

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<b>Conditions and Measures related to municipal sewage treatment plant</b>	
Estimated substance removal from wastewater via domestic sewage treatment (%)	94,1
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	3,5E+05
Assumed domestic sewage treatment plant flow (m3/d)	2.000
<b>Conditions and Measures related to external treatment of waste for disposal</b>	
Combustion emissions limited by required exhaust emission controls. Waste combustion emissions considered in regional exposure assessment.	
<b>Conditions and measures related to external recovery of waste</b>	
External recovery and recycling of waste should comply with applicable local and/or regional regulations.	

<b>SECTION 3</b>	<b>EXPOSURE ESTIMATION</b>
<b>Section 3.1 - Health</b>	
The ECETOC TRA tool has been used to estimate consumer exposures unless otherwise indicated.	

<b>Section 3.2 - Environment</b>	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.	

<b>SECTION 4</b>	<b>GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO</b>
<b>Section 4.1 - Health</b>	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.	

<b>Section 4.2 -Environment</b>	
Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org">http://cefic.org</a> ).	



# TCI AMERICA

## SAFETY DATA SHEET

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Revision number: 1  
Revision date: 07/06/2018

### 1. IDENTIFICATION

**Product name:** 1,1,1,2-Tetrachloroethane  
**Product code:** T0695  
**Product use:** For laboratory research purposes.  
**Restrictions on use:** Not for drug or household use.

Company:  
TCI America  
9211 N. Harborside Street  
Portland, OR 97203 U.S.A.  
Telephone:  
+1-800-423-8616 / +1-503-283-1681  
Fax:  
+1-888-520-1075 / +1-503-283-1987  
e-mail:  
sales-US@TCIchemicals.com  
www.TCIchemicals.com

**Emergency telephone number:**  
Chemical Emergencies:  
TCI America (8:00am - 5:00pm) PST  
+1-503-286-7624  
Transportation Emergencies:  
Chemtrec 24-Hour  
+1-800-424-9300 (U.S.A.)  
+1-703-527-3887 (International)  
**Responsible department:**  
TCI America  
Environmental Health Safety and Security  
+1- 503-286-7624

### 2. HAZARD(S) IDENTIFICATION

**OSHA Haz Com: CFR 1910.1200:** Acute Toxicity - Oral [Category 4]  
**WHMIS 2015:** Acute Toxicity - Inhalation [Category 4]  
Skin Corrosion/Irritation [Category 2]  
Eye Damage/Irritation [Category 1]  
Carcinogenicity [Category 2]  
Aquatic Hazard (Acute) [Category 3]

**Signal word:** Danger!

**Hazard Statement(s):** Harmful if swallowed or if inhaled  
Causes skin irritation  
Causes serious eye damage  
Suspected of causing cancer  
Harmful to aquatic life

**Pictogram(s) or Symbol(s):**



**Precautionary Statement(s):**  
[Prevention]

[Response]

[Storage]

[Disposal]

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Avoid breathing mist, vapors or spray. Use only outdoors or in a well-ventilated area. Avoid release to the environment. Do not eat, drink or smoke when using this product. Wash hands and face thoroughly after handling. Wear protective gloves, protective clothing, face protection.  
If swallowed: Call a poison center or doctor if you feel unwell. Rinse mouth. If on skin: Wash with plenty of soap and water. If skin irritation occurs: Get medical advice or attention. Take off contaminated clothing and wash it before reuse. 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. Immediately call a poison center or doctor. If exposed or concerned: Get medical advice or attention.  
Store locked up.  
Dispose of contents and container in accordance with local, regional, national regulations (e.g. US: 40 CFR Part 261, EU:91/156/EEC, JP: Waste Disposal and Cleaning Act, etc.).

**Hazards not otherwise classified:**  
[HNOC]

None.

**3. COMPOSITION/INFORMATION ON INGREDIENTS**

<b>Substance/mixture:</b>	Substance
<b>Components:</b>	1,1,1,2-Tetrachloroethane
<b>Percent:</b>	>99.0%(GC)
<b>CAS RN:</b>	630-20-6
<b>Molecular Weight:</b>	167.84
<b>Chemical Formula:</b>	C <sub>2</sub> H <sub>2</sub> Cl <sub>4</sub>

**4. FIRST-AID MEASURES****Description of first aid measures**

<b>Inhalation:</b>	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical advice/attention.
<b>Skin contact:</b>	Remove/Take off immediately all contaminated clothing. Gently wash with plenty of soap and water. Get medical advice/attention.
<b>Eye contact:</b>	Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Get medical advice/attention.
<b>Ingestion:</b>	Get medical advice/attention. Rinse mouth.

**Symptoms/effects:**

<b>Acute:</b>	Pain. Redness.
<b>Delayed:</b>	No data available

**Indication of any immediate medical attention:**

Not available.

**Notes to physician:**

No data available

**5. FIRE-FIGHTING MEASURES**

<b>Suitable extinguishing media:</b>	Dry chemical, foam, water spray, carbon dioxide.
<b>Specific hazards arising from the chemical:</b>	Take care as it may decompose upon combustion or in high temperatures to generate poisonous fume.
<b>Hazardous combustion products:</b>	These products include: Carbon oxides Halogenated compounds
<b>Other specific hazards:</b>	WARNING: Highly toxic HCl gas is produced during combustion.
<b>Advice for firefighters:</b>	Wear self-contained breathing apparatus if possible.

**6. ACCIDENTAL RELEASE MEASURES**

<b>Personal precautions, protective equipment and emergency procedures:</b>	Use personal protective equipment. Keep people away from and upwind of spill/leak. Ensure adequate ventilation. Entry to non-involved personnel should be controlled around the leakage area by roping off, etc.
<b>Environmental precautions:</b>	Prevent product from entering drains.
<b>Methods and materials for containment and cleaning up:</b>	Absorb spilled material in a suitable absorbent (e.g. rag, dry sand, earth, saw-dust). In case of large amount of spillage, contain a spill by bunding. Adhered or collected material should be promptly disposed of, in accordance with appropriate laws and regulations.

**7. HANDLING AND STORAGE**

<b>Precautions for safe handling:</b>	Handling is performed in a well ventilated place. Wear suitable protective equipment. Prevent generation of vapour or mist. Wash hands and face thoroughly after handling. Use a closed system if possible. Use a ventilation, local exhaust if vapour or aerosol will be generated. Avoid all contact!
<b>Conditions for safe storage, including any incompatibilities</b>	
<b>Storage conditions:</b>	Keep container tightly closed. Store in a cool and dark place. Store locked up. Store away from incompatible materials such as oxidizing agents.
<b>Packaging material:</b>	Comply with laws.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

<b>Appropriate engineering controls:</b>	Follow safe industrial engineering/laboratory practices when handling any chemical. Install a closed system or local exhaust. Also install safety shower and eye bath.
<b>Personal protective equipment</b>	
<b>Respiratory protection:</b>	Half or full facepiece respirator, self-contained breathing apparatus(SCBA), supplied air respirator, etc. Use respirators approved under appropriate government standards and follow local and national regulations.
<b>Hand protection:</b>	Impervious gloves.
<b>Eye protection:</b>	Safety goggles. A face-shield, if the situation requires.
<b>Skin and body protection:</b>	Impervious protective clothing. Protective boots, if the situation requires.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Physical state (20°C):</b>	Liquid		
<b>Form:</b>	Clear		
<b>Colour:</b>	Colorless - Almost colorless		
<b>Odour:</b>	No data available		
<b>Odor threshold:</b>	No data available		
<b>Odour threshold:</b>	No data available		
<b>Melting point/freezing point:</b>	No data available	<b>pH:</b>	No data available
<b>Boiling point/range:</b>	131°C (268°F)	<b>Vapour pressure:</b>	No data available.
<b>Decomposition temperature:</b>	No data available	<b>Vapour density:</b>	No data available
<b>Relative density:</b>	1.56	<b>Dynamic Viscosity:</b>	No data available
<b>Kinematic viscosity:</b>	No data available		
<b>Log Pow:</b>	No data available	<b>Evaporation rate(Butyl Acetate=1):</b>	No data available
<b>Flash point:</b>	No data available	<b>Autoignition temperature:</b>	No data available
<b>Flammability(solid, gas):</b>	No data available	<b>Flammability or explosive limits:</b>	
		<b>Lower:</b>	No data available
		<b>Upper:</b>	No data available
<b>Solubility(ies):</b>			
<b>[Water]</b>	No data available		
<b>[Other solvents]</b>			
<b>Soluble:</b>	Ether, Alcohols, Benzene, Acetone, Chloroform		

## 10. STABILITY AND REACTIVITY

<b>Reactivity:</b>	No data available
<b>Chemical stability:</b>	Stable under proper conditions.
<b>Possibility of hazardous reactions:</b>	No special reactivity has been reported.
<b>Incompatible materials:</b>	Oxidizing agents
<b>Hazardous decomposition products:</b>	Carbon dioxide, Carbon monoxide, Hydrogen chloride

**11. TOXICOLOGICAL INFORMATION****RTECS Number:** KI8450000**Acute Toxicity:**

ihl-rat LC50:2100 ppm/4H

orl-rat LD50:670 mg/kg

**Skin corrosion/irritation:**

No data available

**Serious eye damage/irritation:**

No data available

**Respiratory or skin sensitization:**

No data available

**Germ cell mutagenicity:**

mmo-sat 10 ug/plate (+/-S9)

msc-mus-lym 200 mg/L

**Carcinogenicity:**

No data available

**IARC:** Group 2B (Possibly carcinogenic to humans) .**NTP:** No data available**OSHA:** No data available**Reproductive toxicity:**

No data available

**Target organ(s):**

No data available

**12. ECOLOGICAL INFORMATION****Ecotoxicity:****Fish:** No data available**Crustacea:** No data available**Algae:** No data available**Persistence / degradability:**

No data available

**Bioaccumulative potential(BCF):**

No data available

**Mobility in soil****Log Pow:** No data available**Soil adsorption (Koc):** No data available**Henry's Law (PaM<sup>3</sup>/mol):** No data available**13. DISPOSAL CONSIDERATIONS****Disposal of product:**

Recycle to process if possible. It is the generator's responsibility to comply with Federal, State and Local rules and regulations. You may be able to dissolve or mix material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber system. This section is intended to provide assistance but does not replace these laws, nor does compliance in accordance with this section ensure regulatory compliance according to the law. US EPA guidelines for Identification and Listing of Hazardous Waste are listed in 40 CFR Parts 261. The product should not be allowed to enter the environment, drains, water ways, or the soil.

**Disposal of container:**

Dispose of as unused product. Do not re-use empty containers.

**Other considerations:**

Observe all federal, state and local regulations when disposing of the substance.

**14. TRANSPORT INFORMATION****DOT (US)**

<b>UN number:</b> UN2810	<b>Proper Shipping Name:</b> Toxic, liquids, organic, n.o.s	<b>Class or Division:</b> 6.1 Toxic material.	<b>Packing Group:</b> III
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**IATA**

<b>UN number:</b> UN2810	<b>Proper Shipping Name:</b> Toxic liquid, organic, n.o.s	<b>Class or Division:</b> 6.1 Toxic material.	<b>Packing Group:</b> III
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**IMDG**

<b>UN number:</b> UN2810	<b>Proper Shipping Name:</b> Toxic liquid, organic, n.o.s	<b>Class or Division:</b> 6.1 Toxic material.	<b>Packing Group:</b> III
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**EmS number:** F-A, S-A

**15. REGULATORY INFORMATION****Toxic Substance Control Act (TSCA 8b.):**

This product is ON the EPA Toxic Substances Control Act (TSCA) inventory.

**US Federal Regulations****CERCLA Hazardous substance and Reportable Quantity:**

<b>SARA 313:</b>	Listed
<b>SARA 302:</b>	Not Listed

**State Regulations****State Right-to-Know**

<b>Massachusetts</b>	Listed
<b>New Jersey</b>	Listed
<b>Pennsylvania</b>	Listed

**California Proposition 65:** Listed

**Other Information****NFPA Rating:**

<b>Health:</b>	2
<b>Flammability:</b>	0
<b>Instability:</b>	0

**HMIS Classification:**

<b>Health:</b>	2
<b>Flammability:</b>	0
<b>Physical:</b>	0

**International Inventories**

<b>Canada: DSL</b>	On DSL
<b>EC-No:</b>	211-135-1

**16. OTHER INFORMATION**

**Revision date:** 07/06/2018

**Revision number:** 1

TCI chemicals are for research purposes only and are NOT intended for use as drugs, food additives, households, or pesticides. The information herein is believed to be correct, but does not claim to be all inclusive and should be used only as a guide. Neither the above named supplier nor any of its affiliates or 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 chemical reagents must be handled with the recognition that their chemical, physiological, toxicological, and hazardous properties have not been fully investigated or determined. All chemical reagents should be handled only by individuals who are familiar with their potential hazards and who have been fully trained in proper safety, laboratory, and chemical handling procedures. Although certain hazards are described herein, we can not guarantee that these are the only hazards which exist. Our SDS are based only on data available at the time of shipping and are subject to change without notice as new information is obtained. Avoid long storage periods since the product is subject to degradation with age and may become more dangerous or hazardous. It is the responsibility of the user to request updated SDS for products that are stored for extended periods. Disposal of unused product must be undertaken by qualified personnel who are knowledgeable in all applicable regulations and follow all pertinent safety precautions including the use of appropriate protective equipment (e.g. protective goggles, protective clothing, breathing equipment, face mask, fume hood). For proper handling and disposal, always comply with federal, state and local regulations.





**MATHESON**

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## Safety Data Sheet

Material Name METHYL CHLOROFORM

SDS ID: MAT14370

### \*\*\*Section 1 - IDENTIFICATION\*\*\*

**Product Identifier:** METHYL CHLOROFORM

**Trade Names/Synonyms**

MTG MSDS 219; 1,1,1-TRICHLOROETHANE; ALPHA-TRICHLOROETHANE; AEROTHENE TT;  
METHYLTRICHLOROMETHANE; METHYLCHLOROFORM; TRICHLOROMETHYLMETHANE;  
TRICHLOROETHANE; ETHANE, 1,1,1-TRICHLOROETHANE; CHLORTEN; 1,1,1-TRICHLORETHANE; UN  
2831; C2H3Cl3

**Chemical Family**

halogenated, aliphatic

**Recommended Use**

industrial

**Restrictions on Use**

None known.

**Manufacturer Information**

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 29 CFR 1910.1200**

Acute Toxicity (Inhalation), Category 4  
Skin Corrosion / Irritation, Category 2  
Eye Damage / Irritation, Category 2A  
Toxic to Reproduction, Category 2  
Specific Target Organ Toxicity - Single Exposure, Category 1 (central nervous system and heart)  
Specific Target Organ Toxicity - Single Exposure, Category 3 (respiratory system)  
Specific Target Organ Toxicity - Repeated Exposure, Category 1 (central nervous system, heart, and liver)  
Specific Target Organ Toxicity - Repeated Exposure, Category 2 (brain, lungs, and nervous system)  
Hazardous to the Aquatic Environment - Acute Hazard, Category 2  
Hazardous to the Aquatic Environment - Chronic Hazard, Category 2  
Hazardous for the ozone layer, Category 1

**GHS LABEL ELEMENTS**

**Symbol(s)**



**Signal Word**

DANGER

# Safety Data Sheet

Material Name METHYL CHLOROFORM

SDS ID: MAT14370

## Hazard Statement(s)

Harmful if inhaled  
Causes skin irritation  
Causes serious eye irritation  
Suspected of damaging fertility or the unborn child  
Causes damage to central nervous system and heart.  
May cause respiratory tract irritation.  
Causes damage to central nervous system, heart, and liver through prolonged or repeated exposure.  
May cause damage to brain, lungs, nervous system through prolonged or repeated exposure.  
Toxic to aquatic life with long lasting effects  
Harms public health and the environment by destroying ozone in the upper atmosphere

## Precautionary Statement(s)

### Prevention

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

IF exposed: Call a POISON CENTER or doctor/physician. 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: Wash with plenty of soap and water. If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash 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. Collect spillage.

### Storage

Store in a well-ventilated place. Keep container tightly closed. Store locked up.

### Disposal

Dispose of in accordance with applicable regulations.  
Refer to manufacturer/supplier for information on recovery/recycling.

## \*\*\*Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS\*\*\*

CAS	Component	Percent
71-55-6	METHYL CHLOROFORM	100

## Component Related Regulatory Information

This product may be regulated, have exposure limits or other information identified as the following:  
Trichloroethane (25323-89-1).

## \*\*\*Section 4 - FIRST AID MEASURES\*\*\*

### Description of Necessary 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.

# Safety Data Sheet

Material Name METHYL CHLOROFORM

SDS ID: MAT14370

## 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

If vomiting occurs, keep head lower than hips to help prevent aspiration. If person is unconscious, turn head to side. Get medical attention immediately.

## Most Important Symptoms/Effects

### Acute

respiratory tract irritation, skin irritation, eye irritation, central nervous system depression, central nervous system damage, heart damage

### Delayed

central nervous system damage, heart damage, liver damage, reproductive effects, lung damage, brain damage, nervous system damage

## Indication of Immediate Medical Attention and Special Treatment

For inhalation, consider oxygen.

## \* \* \*Section 5 - FIRE FIGHTING MEASURES\* \* \*

### Suitable Extinguishing Media

carbon dioxide, regular dry chemical, water spray

Large fires: Use dry chemical, carbon dioxide, alcohol-resistant foam or water spray.

### Unsuitable Extinguishing Media

Do not scatter spilled material with high-pressure water streams.

### Specific Hazards Arising from the Chemical

Slight fire hazard.

### Hazardous Combustion Products

**Combustion:** hydrogen chloride, phosgene, oxides of carbon

### Fire Fighting Measures

Move container from fire area if it can be done without risk. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with water spray until well after the fire is out. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. Stay away from the ends of tanks. For tank, rail car or tank truck, evacuation radius: 800 meters (1/2 mile).

### 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. Avoid release to the environment.

### 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. Stop leak if possible without personal risk. **Small spills:** Absorb with sand or other non-combustible material. Collect spilled material in appropriate container for disposal. **Large spills:** Dike for later disposal. Remove sources of ignition. 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).

# Safety Data Sheet

Material Name METHYL CHLOROFORM

SDS ID: MAT14370

## \*\*\*Section 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. 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.

### Conditions for Safe Storage, including any Incompatibilities

Store and handle in accordance with all current regulations and standards. Store in a well-ventilated place. Keep container tightly closed. Store locked up. Store in a cool, dry place. Keep separated from incompatible substances.

**Incompatibilities** combustible materials, bases, metals, oxidizing materials

## \*\*\*Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION\*\*\*

### Component Exposure Limits

#### METHYL CHLOROFORM (71-55-6)

**ACGIH:** 350 ppm TWA

450 ppm STEL

**Europe:** 100 ppm TWA; 555 mg/m<sup>3</sup> TWA

200 ppm STEL; 1110 mg/m<sup>3</sup> STEL

**OSHA (Final):** 350 ppm TWA; 1900 mg/m<sup>3</sup> TWA

**OSHA (Vacated):** 350 ppm TWA; 1900 mg/m<sup>3</sup> TWA

450 ppm STEL; 2450 mg/m<sup>3</sup> STEL

**NIOSH:** 350 ppm Ceiling (15 min); 1900 mg/m<sup>3</sup> Ceiling (15 min)

### Component Biological Limit Values

#### METHYL CHLOROFORM (71-55-6)

**ACGIH:** 40 ppm Medium: end-exhaled air Time: prior to last shift of workweek Parameter: Methyl chloroform; 10 mg/L Medium: urine Time: end of workweek Parameter: Trichloroacetic acid (nonspecific, semi-quantitative); 30 mg/L Medium: urine Time: end of shift at end of workweek Parameter: Total trichloroethanol (nonspecific, semi-quantitative); 1 mg/L Medium: blood Time: end of shift at end of workweek Parameter: Total trichloroethanol (nonspecific)

### IDLH

700 ppm

### Appropriate Engineering Controls

Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

### Individual Protection Measures, such as Personal Protective Equipment

#### Eyes/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.

#### Glove Recommendations

Wear appropriate chemical resistant gloves.

#### Respiratory Protection

The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA.

700 ppm

Any supplied-air respirator.

# Safety Data Sheet

Material Name METHYL CHLOROFORM

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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.

## \*\*\*Section 9 - PHYSICAL AND CHEMICAL PROPERTIES\*\*\*

<b>Physical State:</b>	Liquid	<b>Appearance:</b>	clear, colorless liquid
<b>Color:</b>	colorless	<b>Physical Form:</b>	volatile liquid
<b>Odor:</b>	sweet odor	<b>Odor Threshold:</b>	44 - 100 ppm
<b>pH:</b>	Not available	<b>Melting/Freezing Point:</b>	-32 °C
<b>Boiling Point:</b>	74 °C	<b>Flash Point:</b>	>93.3 °C
<b>Decomposition:</b>	Not available	<b>Evaporation Rate:</b>	5.0 (butyl acetate=1)
<b>LEL:</b>	7.5 %	<b>UEL:</b>	12.5 %
<b>Vapor Pressure:</b>	100 mmHg @ 20 °C	<b>Henry's Law Constant:</b>	0.072 atm-cu m/mole @ 25°C
<b>Vapor Density (air = 1):</b>	4.55	<b>Specific Gravity (water=1):</b>	1.3390
<b>Water Solubility:</b>	0.078 % @ 25 °C	<b>Log KOW:</b>	2.49
<b>KOC:</b>	17823.79 estimated from water solubility	<b>Auto Ignition:</b>	537 °C
<b>Viscosity:</b>	0.858 cP @20 °C	<b>Volatility:</b>	100%
<b>Molecular Weight:</b>	133.40	<b>Molecular Formula:</b>	C-H3-C-Cl3

### Other Property Information

No additional information is available.

### Solvent Solubility

**Soluble:** acetone, benzene, chloroform, methanol, ethanol, carbon disulfide, ether, carbon tetrachloride, heptane

## \*\*\*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.

### Incompatible Materials

combustible materials, bases, metals, oxidizing materials

### Hazardous Decomposition

**Combustion:** hydrogen chloride, phosgene, oxides of carbon

# Safety Data Sheet

Material Name METHYL CHLOROFORM

SDS ID: MAT14370

## \*\*\*Section 11 - TOXICOLOGICAL INFORMATION\*\*\*

### 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:

#### **METHYL CHLOROFORM (71-55-6)**

Dermal LD50 Rabbit >15800 mg/kg; Inhalation LC50 Rat 18000 ppm 4 h; Oral LD50 Rat >2000 mg/kg

#### RTECS Acute Toxicity (selected)

The components of this material have been reviewed, and RTECS publishes the following endpoints:

#### **METHYL CHLOROFORM (71-55-6)**

**Inhalation:** 24400 mg/m3 Inhalation Cat LC50; 29492 ppm/10 minute(s) Inhalation Mouse LC50; 3911 ppm/2 hour Inhalation Mouse LC50; 20000 ppm/2 hour Inhalation Rat LC50; 14250 ppm/7 hour Inhalation Rat LC50; 17000 ppm/4 hour Inhalation Rat LC50

### Acute Toxicity Level

#### **METHYL CHLOROFORM (71-55-6)**

**Slightly Toxic:** inhalation, dermal absorption, ingestion

### Information on Likely Routes of Exposure

#### Inhalation

irritation, changes in blood pressure, nausea, vomiting, diarrhea, difficulty breathing, irregular heartbeat, headache, drowsiness, dizziness, mood swings, loss of coordination, blood disorders, heart disorders, kidney damage, liver damage, convulsions, unconsciousness, coma, heart damage, reproductive effects

#### Ingestion

irritation, nausea, vomiting, diarrhea, stomach pain, irregular heartbeat, headache, drowsiness, dizziness, disorientation, loss of coordination, kidney damage, liver damage, convulsions, unconsciousness, coma, reproductive effects

#### Skin Contact

irritation (possibly severe)

#### Eye Contact

irritation

#### Immediate Effects

respiratory tract irritation, skin irritation, eye irritation, central nervous system depression, central nervous system damage, heart damage

#### Delayed Effects

central nervous system damage, heart damage, liver damage, reproductive effects, brain damage, lung damage, nervous system damage

#### Medical Conditions Aggravated by Exposure

heart or cardiovascular disorders, kidney disorders, liver disorders, skin disorders and allergies

#### Irritation/Corrosivity Data

respiratory tract irritation, skin irritation, eye irritation

#### RTECS Irritation

The components of this material have been reviewed, and RTECS publishes the following endpoints:

#### **METHYL CHLOROFORM (71-55-6)**

450 ppm/8 hour Eyes Man; 100 mg Eyes Rabbit mild; 2 mg/24 hour Eyes Rabbit severe; 5 gm/12 day(s) intermittent Skin Rabbit mild; 20 mg/24 hour Skin Rabbit moderate

# Safety Data Sheet

Material Name METHYL CHLOROFORM

SDS ID: MAT14370

## Local Effects

**METHYL CHLOROFORM (71-55-6)**

Irritant: inhalation, skin, eye

## Target Organs

**METHYL CHLOROFORM (71-55-6)**

central nervous system

## Respiratory Sensitization

No data available.

## Dermal Sensitization

No data available.

## Carcinogenicity

### Component Carcinogenicity

**METHYL CHLOROFORM (71-55-6)**

ACGIH: A4 - Not Classifiable as a Human Carcinogen

IARC: Monograph 71 [1999]; Supplement 7 [1987]; Monograph 20 [1979] (Group 3 (not classifiable))

## RTECS Mutagenic

The components of this material have been reviewed, and RTECS publishes data for one or more components.

## Reproductive Effects Data

Available data characterizes this substance as a reproductive hazard.

## RTECS Reproductive Effects

The components of this material have been reviewed, and RTECS publishes the following endpoints:

**METHYL CHLOROFORM (71-55-6)**

2100 ppm Inhalation Rat TCLo (6 hour, pregnant 1-20 day(s)); 7000 ppm Inhalation Rat TCLo (3 hour, pregnant 13-19 day(s)); 43 mg/kg Oral Rat TDLo (pregnant 1-22 day(s), 21 day(s))

## RTECS Tumorigenic

The components of this material have been reviewed, and RTECS publishes data for one or more components.

## Additional Data

Alcohol may enhance the toxic effects. Stimulants such as epinephrine may induce ventricular fibrillation.

## Specific Target Organ Toxicity - Single Exposure

central nervous system, heart, respiratory system

## Specific Target Organ Toxicity - Repeated Exposure

central nervous system, heart, liver, brain, lungs, nervous system

## Aspiration Hazard

Not expected to be an aspiration hazard.

## \*\*\*Section 12 - ECOLOGICAL INFORMATION\*\*\*

## Ecotoxicity

Toxic to aquatic life with long lasting effects.



# Safety Data Sheet

Material Name METHYL CHLOROFORM

SDS ID: MAT14370

## Component Analysis - Aquatic Toxicity

### METHYL CHLOROFORM (71-55-6)

**Fish:** 96 Hr LC50 Pimephales promelas: 35.2 - 50.7 mg/L [flow-through]; 96 Hr LC50 Lepomis macrochirus: 57 - 90 mg/L [static] (juvenile); 96 Hr LC50 Cyprinus carpio: 56 mg/L [flow-through]; 96 Hr LC50 Poecilia reticulata: 52.9 mg/L [flow-through]; 96 Hr LC50 Poecilia reticulata: 69.7 mg/L [static]; 96 Hr LC50 Pimephales promelas: 91 - 126 mg/L [static]; 96 Hr LC50 Oncorhynchus mykiss: 46 - 59 mg/L [static]

**Algae:** 96 Hr EC50 Pseudokirchneriella subcapitata: >500 mg/L

**Invertebrate:** 48 Hr LC50 Daphnia magna: >530 mg/L; 48 Hr EC50 Daphnia magna: 2384 mg/L; 48 Hr EC50 Daphnia magna: 9.7 - 12.8 mg/L [Static]

## Persistence and Degradability

This material may biodegrade in soil and water.

## Bioaccumulative Potential

Bioconcentration potential in aquatic organisms is low based on BCF value of 0.7-4.9.

## Mobility

Expected to have high mobility in soil.

## \*\*\*Section 13 - DISPOSAL CONSIDERATIONS\*\*\*

### Disposal Methods

Dispose in accordance with all applicable regulations.

### Component Waste Numbers

#### METHYL CHLOROFORM (71-55-6)

RCRA: waste number U226

## \*\*\*Section 14 - TRANSPORT INFORMATION\*\*\*

### US DOT Information

**Shipping Name:** 1,1,1-Trichloroethane  
**UN/NA #:** UN2831 **Hazard Class:** 6.1 **Packing Group:** III  
**Required Label(s):** 6.1

### IMDG Information

**Shipping Name:** 1,1,1-Trichloroethane  
**UN #:** UN2831 **Hazard Class:** 6.1 **Packing Group:** III  
**Required Label(s):** 6.1

## \*\*\*Section 15 - REGULATORY INFORMATION\*\*\*

### Component Analysis

#### U.S. Federal Regulations

This material contains one or more of the following chemicals required to be identified under SARA Section 302/304 (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.

#### METHYL CHLOROFORM (71-55-6)

**SARA 313:** 1.0 % de minimis concentration  
**CERCLA:** 1000 lb final RQ; 454 kg final RQ

#### SARA 311/312 Hazardous Categories

**Acute Health:** Yes **Chronic Health:** Yes **Fire:** No **Pressure:** No **Reactive:** No

# Safety Data Sheet

Material Name METHYL CHLOROFORM

SDS ID: MAT14370

## 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
METHYL CHLOROFORM	71-55-6	Yes	Yes	Yes	Yes	Yes

Not regulated under California Proposition 65

## Component Analysis - Inventory

Component	CAS	US	CA	EU	AU	PH	JP	KR	CN	NZ
METHYL CHLOROFORM	71-55-6	Yes	DSL	EIN	Yes	Yes	Yes	Yes	Yes	Yes

## \* \* \*Section 16 - OTHER INFORMATION\* \* \*

NFPA Ratings: Health: 2 Fire: 1 Reactivity: 0

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

### Key / Legend

ACGIH - American Conference of Governmental Industrial Hygienists; ADR - European Road Transport; AU - Australia; BOD - Biochemical Oxygen Demand; C - Celsius; CA - Canada; CAS - Chemical Abstracts Service; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CN - China; CPR - Controlled Products Regulations; DFG - Deutsche Forschungsgemeinschaft; DOT - Department of Transportation; DSL - Domestic Substances List; EEC - European Economic Community; EINECS - European Inventory of Existing Commercial Chemical Substances; 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; JP - Japan; Kow - Octanol/water partition coefficient; KR - Korea; LEL - Lower Explosive Limit; LOLI - List Of Lists™ - ChemADVISOR's Regulatory Database; MAK - Maximum Concentration Value in the Workplace; MEL - Maximum Exposure Limits; 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; PH - Philippines; RCRA - Resource Conservation and Recovery Act; RID - European Rail Transport; RTECS - Registry of Toxic Effects of Chemical Substances®; SARA - Superfund Amendments and Reauthorization Act; STEL - Short-term Exposure Limit; TDG - Transportation of Dangerous Goods; TSCA - Toxic Substances Control Act; TWA - Time Weighted Average; UEL - Upper Explosive Limit; US - United States

### Other Information

Matheson Tri-Gas, Inc. makes no express or implied warranties, guarantees or representations regarding the product or the information herein, including but not limited to any implied warranty or merchantability or fitness for use. Matheson Tri-Gas, Inc. shall not be liable for any personal injury, property or other damages of any nature, whether compensatory, consequential, exemplary, or otherwise, resulting from any publication, use or reliance upon the information herein.

End of Sheet MAT14370

**SAFETY DATA SHEET**

Creation Date 22-Sep-2009

Revision Date 25-Apr-2019

Revision Number 6

**1. Identification**

**Product Name** Vinylidene chloride, stabilized

**Cat No. :** AC172290000; AC172290010; AC172290025; AC172290250

**CAS-No** 75-35-4  
**Synonyms** 1,1-Dichloroethylene

**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  
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 11Emergency 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 1
Acute oral toxicity	Category 4
Acute Inhalation Toxicity - Vapors	Category 4
Serious Eye Damage/Eye Irritation	Category 2
Carcinogenicity	Category 2
Specific target organ toxicity - (repeated exposure)	Category 2
Target Organs - Nasal Cavities, Liver.	

**Label Elements****Signal Word**

Danger

**Hazard Statements**

Extremely flammable liquid and vapor

Causes serious eye irritation

Suspected of causing cancer  
May cause damage to organs through prolonged or repeated exposure  
Harmful if swallowed or if inhaled



### 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  
Use only outdoors or in a well-ventilated area  
Wear eye/face protection  
Do not breathe dust/fume/gas/mist/vapors/spray  
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

#### 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

#### Ingestion

IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell

Rinse mouth

#### Fire

In case of fire: Use CO<sub>2</sub>, dry chemical, or foam for extinction

#### Storage

Store locked up  
Store in a well-ventilated place. Keep cool

#### Disposal

Dispose of contents/container to an approved waste disposal plant

#### Hazards not otherwise classified (HNOC)

Toxic to aquatic life with long lasting effects

WARNING. Cancer - <https://www.p65warnings.ca.gov/>.

## 3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Vinylidene chloride	75-35-4	>95
4-Methoxyphenol	150-76-5	0.02

#### 4. First-aid measures

<b>Eye Contact</b>	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.
<b>Skin Contact</b>	Wash off immediately with plenty of water for at least 15 minutes. Get medical attention.
<b>Inhalation</b>	Remove to fresh air. If breathing is difficult, give oxygen. Get medical attention.
<b>Ingestion</b>	Do NOT induce vomiting. Get medical attention.
<b>Most important symptoms and effects</b>	Difficulty in breathing. . Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting
<b>Notes to Physician</b>	Treat symptomatically

#### 5. Fire-fighting measures

<b>Suitable Extinguishing Media</b>	Water spray. Carbon dioxide (CO <sub>2</sub> ). Dry chemical. Water mist may be used to cool closed containers. Chemical foam. Water mist may be used to cool closed containers.
<b>Unsuitable Extinguishing Media</b>	No information available
<b>Flash Point</b>	-25 °C / -13 °F
<b>Method -</b>	No information available
<b>Autoignition Temperature</b>	520 °C / 968 °F
<b>Explosion Limits</b>	
<b>Upper</b>	16.5%
<b>Lower</b>	8.4%
<b>Sensitivity to Mechanical Impact</b>	No information available
<b>Sensitivity to Static Discharge</b>	No information available

#### Specific Hazards Arising from the Chemical

Extremely flammable. Vapors may travel to source of ignition and flash back. Vapors may form explosive mixture with air. Containers may explode when heated. Vapors may form explosive mixtures with air.

#### Hazardous Combustion Products

Carbon monoxide (CO). Carbon dioxide (CO<sub>2</sub>). Formaldehyde. peroxides. Hydrogen chloride gas.

#### Protective Equipment and Precautions for Firefighters

Vapors are heavier than air and may spread along floors. As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

#### NFPA

**Health**  
2

**Flammability**  
4

**Instability**  
1

**Physical hazards**  
N/A

#### 6. Accidental release measures

<b>Personal Precautions</b>	Remove all sources of ignition. Take precautionary measures against static discharges.
<b>Environmental Precautions</b>	Do not flush into surface water or sanitary sewer system. See Section 12 for additional Ecological Information. Avoid release to the environment. Collect spillage.
<b>Methods for Containment and Clean Up</b>	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. Do not let this chemical enter the environment.

## 7. Handling and storage

<b>Handling</b>	Ensure adequate ventilation. Wear personal protective equipment/face protection. Avoid contact with skin and eyes. Take precautionary measures against static discharges. Do not ingest. If swallowed then seek immediate medical assistance. Handle product only in closed system or provide appropriate exhaust ventilation. Use spark-proof tools and explosion-proof equipment. Use only non-sparking tools. Do not subject to grinding/shock/friction. Avoid breathing dust/fume/gas/mist/vapors/spray. Keep away from open flames, hot surfaces and sources of ignition. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded.
<b>Storage</b>	Refrigerator/flammables. Keep away from heat, sparks and flame. Protect from light. May form explosive peroxides on prolonged storage. Keep under nitrogen. 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	Mexico OEL (TWA)
Vinylidene chloride	TWA: 5 ppm	(Vacated) TWA: 1 ppm (Vacated) TWA: 4 mg/m <sup>3</sup>		TWA: 5 ppm
4-Methoxyphenol	TWA: 5 mg/m <sup>3</sup>	(Vacated) TWA: 5 mg/m <sup>3</sup>	TWA: 5 mg/m <sup>3</sup>	TWA: 5 mg/m <sup>3</sup>

### Legend

ACGIH - American Conference of Governmental Industrial Hygienists

OSHA - Occupational Safety and Health Administration

NIOSH IDLH: NIOSH - National Institute for Occupational Safety and Health

<b>Engineering Measures</b>	Use explosion-proof electrical/ventilating/lighting/equipment. Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.
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### Personal Protective Equipment

<b>Eye/face Protection</b>	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.
<b>Skin and body protection</b>	Wear appropriate protective gloves and clothing to prevent skin exposure.
<b>Respiratory Protection</b>	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.
<b>Hygiene Measures</b>	Handle in accordance with good industrial hygiene and safety practice.

## 9. Physical and chemical properties

<b>Physical State</b>	Liquid
<b>Appearance</b>	Colorless
<b>Odor</b>	aromatic
<b>Odor Threshold</b>	No information available
<b>pH</b>	7 2.5 g/l aq.sol
<b>Melting Point/Range</b>	-122 °C / -187.6 °F
<b>Boiling Point/Range</b>	31.2 - 32 °C / 88.2 - 89.6 °F @ 760 mmHg
<b>Flash Point</b>	-25 °C / -13 °F
<b>Evaporation Rate</b>	No information available
<b>Flammability (solid,gas)</b>	Not applicable
<b>Flammability or explosive limits</b>	

Upper	16.5%
Lower	8.4%
Vapor Pressure	665 mbar @ 20 °C
Vapor Density	3.4 (Air = 1.0)
Specific Gravity	1.218
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	520 °C / 968 °F
Decomposition Temperature	No information available
Viscosity	.377 mPa.s at 15 °C
Molecular Formula	C <sub>2</sub> H <sub>2</sub> Cl <sub>2</sub>
Molecular Weight	96.94

## 10. Stability and reactivity

<b>Reactive Hazard</b>	None known, based on information available
<b>Stability</b>	May form explosive peroxides. Hazardous polymerization may occur upon depletion of inhibitor. Moisture sensitive. Air sensitive. Light sensitive.
<b>Conditions to Avoid</b>	Keep away from open flames, hot surfaces and sources of ignition. Excess heat. Exposure to air. Exposure to light. Incompatible products. Exposure to moist air or water.
<b>Incompatible Materials</b>	Strong oxidizing agents, Strong bases, Finely powdered metals, oxygen, Peroxides, Metals, copper, Finely powdered metals, Acids
<b>Hazardous Decomposition Products</b>	Carbon monoxide (CO), Carbon dioxide (CO <sub>2</sub> ), Formaldehyde, peroxides, Hydrogen chloride gas
<b>Hazardous Polymerization</b>	Hazardous polymerization may occur.
<b>Hazardous Reactions</b>	None under normal processing.

## 11. Toxicological information

### Acute Toxicity

#### Product Information

**Oral LD50** Category 4. ATE = 300 - 2000 mg/kg.

**Vapor LC50** Category 4. ATE = 10 - 20 mg/l.

#### Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Vinylidene chloride	LD50 = 1500 mg/kg ( Rat ) LD50 = 200 mg/kg ( Rat )	Not listed	LC50 = 1.66 mg/L ( Rat ) 4 h LC50 = 6350 ppm ( Rat ) 4 h
4-Methoxyphenol	1600 mg/kg (Rat)	LD50 > 2000 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** May cause skin, eye, and respiratory tract irritation

**Sensitization** No information available

**Carcinogenicity** Limited evidence of a carcinogenic effect. The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Vinylidene chloride	75-35-4	Group 2B	Not listed	Not listed	X	Not listed
4-Methoxyphenol	150-76-5	Not listed	Not listed	Not listed	Not listed	Not listed

<b>Mutagenic Effects</b>	Ames test: positive.
<b>Reproductive Effects</b>	No information available.
<b>Developmental Effects</b>	No information available.
<b>Teratogenicity</b>	No information available.
<b>STOT - single exposure</b>	None known
<b>STOT - repeated exposure</b>	Nasal Cavities Liver
<b>Aspiration hazard</b>	No information available
<b>Symptoms / effects, both acute and delayed</b>	Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting
<b>Endocrine Disruptor Information</b>	No information available
<b>Other Adverse Effects</b>	The toxicological properties have not been fully investigated. See actual entry in RTECS for complete information.

## 12. Ecological information

### Ecotoxicity

The product contains following substances which are hazardous for the environment. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Vinylidene chloride	Not listed	LC50: 161 - 179 mg/L, 96h static (Pimephales promelas) LC50: 57 - 91 mg/L, 96h static (Lepomis macrochirus) LC50: 85 - 117 mg/L, 96h flow-through (Pimephales promelas)	EC50 > 2000 mg/L 17 h	LC50: 62 - 110 mg/L, 48h Static (Daphnia magna) LC50: 9.0 - 14.0 mg/L, 48h Static (Daphnia magna)
4-Methoxyphenol	Not listed	LC50: = 28.5 mg/L, 96h flow-through (Oncorhynchus mykiss) LC50: = 84.3 mg/L, 96h flow-through (Pimephales promelas)	EC50 = 3.66 mg/L 5 min EC50 = 4.30 mg/L 15 min EC50 = 4.61 mg/L 30 min	Not listed

<b>Persistence and Degradability</b>	No information available
<b>Bioaccumulation/ Accumulation</b>	No information available.
<b>Mobility</b>	Will likely be mobile in the environment due to its volatility.

Component	log Pow
Vinylidene chloride	2.02
4-Methoxyphenol	1.3

## 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
Vinylidene chloride - 75-35-4	U078	-



## 14. Transport information

**DOT**

UN-No UN1303  
 Proper Shipping Name VINYLIDENE CHLORIDE, STABILIZED  
 Hazard Class 3  
 Packing Group I

**TDG**

UN-No UN1303  
 Proper Shipping Name VINYLIDENE CHLORIDE, STABILIZED  
 Hazard Class 3  
 Packing Group I

**IATA**

UN-No UN1303  
 Proper Shipping Name VINYLIDENE CHLORIDE, STABILIZED  
 Hazard Class 3  
 Packing Group I

**IMDG/IMO**

UN-No UN1303  
 Proper Shipping Name VINYLIDENE CHLORIDE, STABILIZED  
 Hazard Class 3  
 Subsidiary Hazard Class P  
 Packing Group I

## 15. Regulatory information

**United States of America Inventory**

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
Vinylidene chloride	75-35-4	X	ACTIVE	-
4-Methoxyphenol	150-76-5	X	ACTIVE	-

**Legend:**

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/NDL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
Vinylidene chloride	75-35-4	X	-	200-864-0	X	X	X	X	KE-10122
4-Methoxyphenol	150-76-5	X	-	205-769-8	X	X	X	X	KE-23353

**U.S. Federal Regulations****SARA 313**

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Vinylidene chloride	75-35-4	>95	1.0

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
Vinylidene chloride	X	100 lb	X	X

**Clean Air Act**

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Vinylidene chloride	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
Vinylidene chloride	100 lb 1 lb	-

**California Proposition 65** This product contains the following Proposition 65 chemicals.

Component	CAS-No	California Prop. 65	Prop 65 NSRL	Category
Vinylidene chloride	75-35-4	Carcinogen	0.88 µg/day	Carcinogen

**U.S. State Right-to-Know Regulations**

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Vinylidene chloride	X	X	X	X	X
4-Methoxyphenol	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 contains the following DHS chemicals:

**Legend** - STQs = Screening Threshold Quantities, APA = A placarded amount

Component	DHS Chemical Facility Anti-Terrorism Standard
Vinylidene chloride	Release STQs - 10000lb

**Other International Regulations**

**Mexico - Grade** No information available

## 16. Other information

**Prepared By** Regulatory Affairs  
 Thermo Fisher Scientific  
 Email: EMSDS.RA@thermofisher.com

**Creation Date** 22-Sep-2009  
**Revision Date** 25-Apr-2019  
**Print Date** 25-Apr-2019  
**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**

**1. Identification****Product identifier** 1,1-Dichloropropene**Other means of identification****Item** N-10125**CAS number** 563-58-6**Recommended use** Not available.**Recommended restrictions** None known.**Manufacturer/Importer/Supplier/Distributor information****Manufacturer****Company name** Chem Service, Inc.  
**Address** 660 Tower Lane  
West Chester, PA 19380  
United States**Telephone** Toll Free 800-452-9994  
Direct 610-692-3026**Website** www.chemservice.com**E-mail** info@chemservice.com**Emergency phone number** Chemtrec US 800-424-9300  
Chemtrec outside US +1 703-527-3887**2. Hazard(s) identification****Physical hazards** Flammable liquids Category 2**Health hazards** Acute toxicity, oral Category 3**Environmental hazards** Hazardous to the aquatic environment, long-term hazard Category 3**OSHA defined hazards** Not classified.**Label elements****Signal word** Danger**Hazard statement** Highly flammable liquid and vapor. Toxic if swallowed. Harmful to aquatic life with long lasting effects.**Precautionary statement****Prevention**

Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Use explosion-proof electrical/ventilating/lighting equipment. Keep container tightly closed. Wash thoroughly after handling. Ground/bond container and receiving equipment. Wear protective gloves/eye protection/face protection. Use only non-sparking tools. Take precautionary measures against static discharge. Do not eat, drink or smoke when using this product. Avoid release to the environment.

**Response**

If swallowed: Immediately call a poison center/doctor. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. Rinse mouth. In case of fire: Use appropriate media to extinguish.

**Storage**

Store in a well-ventilated place. Keep cool. Store locked up.

**Disposal**

Dispose of contents/container in accordance with local/regional/national/international regulations.

**Hazard(s) not otherwise classified (HNOC)**

None known.

**Supplemental information**

100% of the mixture consists of component(s) of unknown acute dermal toxicity. 100% of the mixture consists of component(s) of unknown acute inhalation toxicity. 100% of the mixture consists of component(s) of unknown acute hazards to the aquatic environment.

### 3. Composition/information on ingredients

#### Substances

Chemical name	Common name and synonyms	CAS number	%
1,1-Dichloropropene		563-58-6	100

### 4. First-aid measures

<b>Inhalation</b>	Move to fresh air. Call a physician if symptoms develop or persist.
<b>Skin contact</b>	Take off immediately all contaminated clothing. Rinse skin with water/shower. Get medical attention if irritation develops and persists.
<b>Eye contact</b>	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Get medical attention if irritation develops and persists.
<b>Ingestion</b>	Call a physician or poison control center immediately. Rinse mouth. Do not induce vomiting without advice from poison control center. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Do not use mouth-to-mouth method if victim ingested the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.
<b>Most important symptoms/effects, acute and delayed</b>	Direct contact with eyes may cause temporary irritation.
<b>Indication of immediate medical attention and special treatment needed</b>	Provide general supportive measures and treat symptomatically. Thermal burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Keep victim warm. Keep victim under observation. Symptoms may be delayed.
<b>General information</b>	Take off all contaminated clothing immediately. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance. Wash contaminated clothing before reuse.

### 5. Fire-fighting measures

<b>Suitable extinguishing media</b>	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO <sub>2</sub> ).
<b>Unsuitable extinguishing media</b>	Do not use water jet as an extinguisher, as this will spread the fire.
<b>Specific hazards arising from the chemical</b>	Vapors may form explosive mixtures with air. Vapors may travel considerable distance to a source of ignition and flash back. During fire, gases hazardous to health may be formed.
<b>Special protective equipment and precautions for firefighters</b>	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
<b>Fire fighting equipment/instructions</b>	In case of fire and/or explosion do not breathe fumes. Move containers from fire area if you can do so without risk.
<b>Specific methods</b>	Use standard firefighting procedures and consider the hazards of other involved materials.
<b>General fire hazards</b>	Highly flammable liquid and vapor.

### 6. Accidental release measures

<b>Personal precautions, protective equipment and emergency procedures</b>	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Wear appropriate protective equipment and clothing during clean-up. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ventilate closed spaces before entering them. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.
<b>Methods and materials for containment and cleaning up</b>	<p>Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area).</p> <p>Large Spills: Stop the flow of material, if this is without risk. Keep combustibles (wood, paper, oil, etc.) away from spilled material. Take precautionary measures against static discharge. Use only non-sparking tools. Dike the spilled material, where this is possible. Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal. Prevent product from entering drains. Following product recovery, flush area with water.</p> <p>Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination. For waste disposal, see section 13 of the SDS.</p> <p>Never return spills to original containers for re-use.</p>

<b>Environmental precautions</b>	Avoid release to the environment. Inform appropriate managerial or supervisory personnel of all environmental releases. Contact local authorities in case of spillage to drain/aquatic environment. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.
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## 7. Handling and storage

<b>Precautions for safe handling</b>	Explosion-proof general and local exhaust ventilation. Do not handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight. Take precautionary measures against static discharges. All equipment used when handling the product must be grounded. Use non-sparking tools and explosion-proof equipment. Do not taste or swallow. Wear appropriate personal protective equipment. When using, do not eat, drink or smoke. Wash hands thoroughly after handling. Avoid release to the environment. Observe good industrial hygiene practices.
<b>Conditions for safe storage, including any incompatibilities</b>	Store locked up. Keep away from heat, sparks and open flame. Prevent electrostatic charge build-up by using common bonding and grounding techniques. Store in original tightly closed container. Keep container tightly closed. Store in a cool, dry place out of direct sunlight. Store in a well-ventilated place. Store away from incompatible materials (see Section 10 of the SDS). Keep in an area equipped with sprinklers.

## 8. Exposure controls/personal protection

<b>Occupational exposure limits</b>	This substance has no PEL, TLV, or other recommended exposure limit.
<b>Biological limit values</b>	No biological exposure limits noted for the ingredient(s).
<b>Appropriate engineering controls</b>	Explosion-proof general and local exhaust ventilation. Eye wash fountain and emergency showers are recommended.
<b>Individual protection measures, such as personal protective equipment</b>	
<b>Eye/face protection</b>	Face shield is recommended. Wear safety glasses with side shields (or goggles).
<b>Skin protection</b>	
<b>Hand protection</b>	Wear appropriate chemical resistant gloves. Suitable gloves can be recommended by the glove supplier.
<b>Other</b>	Wear suitable protective clothing.
<b>Respiratory protection</b>	If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. Respiratory protection not required.
<b>Thermal hazards</b>	Wear appropriate thermal protective clothing, when necessary.
<b>General hygiene considerations</b>	When using do not smoke. Keep away from food and drink. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

## 9. Physical and chemical properties

<b>Appearance</b>	
<b>Physical state</b>	Liquid.
<b>Form</b>	Liquid
<b>Color</b>	Colorless
<b>Odor</b>	Not available.
<b>Odor threshold</b>	Not available.
<b>pH</b>	Not available.
<b>Melting point/freezing point</b>	Not available.
<b>Initial boiling point and boiling range</b>	168.8 - 170.6 °F (76 - 77 °C)
<b>Flash point</b>	32.0 °F (0 °C)
<b>Evaporation rate</b>	Not available.
<b>Flammability (solid, gas)</b>	Not applicable.
<b>Upper/lower flammability or explosive limits</b>	
<b>Flammability limit - lower (%)</b>	Not available.
<b>Flammability limit - upper (%)</b>	Not available.
<b>Explosive limit - lower (%)</b>	Not available.

<b>Explosive limit - upper (%)</b>	Not available.
<b>Vapor pressure</b>	3.2 kPa (77 °F (25 °C))
<b>Vapor density</b>	Not available.
<b>Relative density</b>	Not available.
<b>Solubility(ies)</b>	
<b>Solubility (water)</b>	Not available.
<b>Partition coefficient (n-octanol/water)</b>	Not available.
<b>Auto-ignition temperature</b>	Not available.
<b>Decomposition temperature</b>	Not available.
<b>Viscosity</b>	Not available.
<b>Other information</b>	
<b>Density</b>	1.186 g/ml
<b>Explosive properties</b>	Not explosive.
<b>Flammability class</b>	Flammable IB estimated
<b>Molecular formula</b>	C3-H4-Cl2
<b>Molecular weight</b>	110.98 g/mol
<b>Oxidizing properties</b>	Not oxidizing.
<b>Percent volatile</b>	100 %
<b>VOC</b>	100 %

## 10. Stability and reactivity

<b>Reactivity</b>	The product is stable and non-reactive under normal conditions of use, storage and transport.
<b>Chemical stability</b>	Material is stable under normal conditions.
<b>Possibility of hazardous reactions</b>	Hazardous polymerization does not occur.
<b>Conditions to avoid</b>	Avoid heat, sparks, open flames and other ignition sources. Contact with incompatible materials.
<b>Incompatible materials</b>	Strong oxidizing agents.
<b>Hazardous decomposition products</b>	No hazardous decomposition products are known.

## 11. Toxicological information

### Information on likely routes of exposure

<b>Inhalation</b>	No adverse effects due to inhalation are expected.
<b>Skin contact</b>	No adverse effects due to skin contact are expected.
<b>Eye contact</b>	Direct contact with eyes may cause temporary irritation.
<b>Ingestion</b>	Toxic if swallowed.

**Symptoms related to the physical, chemical and toxicological characteristics** Direct contact with eyes may cause temporary irritation.

### Information on toxicological effects

<b>Acute toxicity</b>	Toxic if swallowed. Not known.
<b>Skin corrosion/irritation</b>	Prolonged skin contact may cause temporary irritation.
<b>Serious eye damage/eye irritation</b>	Direct contact with eyes may cause temporary irritation.

### Respiratory or skin sensitization

<b>Respiratory sensitization</b>	Not a respiratory sensitizer.
<b>Skin sensitization</b>	This product is not expected to cause skin sensitization.
<b>Germ cell mutagenicity</b>	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
<b>Carcinogenicity</b>	Not classifiable as to carcinogenicity to humans.

### IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

## OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

## US. National Toxicology Program (NTP) Report on Carcinogens

Not listed.

<b>Reproductive toxicity</b>	This product is not expected to cause reproductive or developmental effects.
<b>Specific target organ toxicity - single exposure</b>	Not classified.
<b>Specific target organ toxicity - repeated exposure</b>	Not classified.
<b>Aspiration hazard</b>	Not an aspiration hazard.

## 12. Ecological information

<b>Ecotoxicity</b>	Harmful to aquatic life with long lasting effects.
<b>Persistence and degradability</b>	
<b>Bioaccumulative potential</b>	No data available.
<b>Mobility in soil</b>	No data available.
<b>Other adverse effects</b>	The product contains volatile organic compounds which have a photochemical ozone creation potential.

## 13. Disposal considerations

<b>Disposal instructions</b>	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.
<b>Local disposal regulations</b>	Dispose in accordance with all applicable regulations.
<b>Hazardous waste code</b>	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
<b>Waste from residues / unused products</b>	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
<b>Contaminated packaging</b>	Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

## 14. Transport information

### DOT

<b>UN number</b>	UN2047
<b>UN proper shipping name</b>	Dichloropropenes
<b>Transport hazard class(es)</b>	
<b>Class</b>	3
<b>Subsidiary risk</b>	-
<b>Label(s)</b>	3
<b>Packing group</b>	II
<b>Special precautions for user</b>	Read safety instructions, SDS and emergency procedures before handling.
<b>Special provisions</b>	IB2, T4, TP1
<b>Packaging exceptions</b>	150
<b>Packaging non bulk</b>	202
<b>Packaging bulk</b>	242

### IATA

<b>UN number</b>	UN2047
<b>UN proper shipping name</b>	Dichloropropenes
<b>Transport hazard class(es)</b>	
<b>Class</b>	3
<b>Subsidiary risk</b>	-
<b>Packing group</b>	II
<b>Environmental hazards</b>	No.
<b>ERG Code</b>	3L
<b>Special precautions for user</b>	Read safety instructions, SDS and emergency procedures before handling.



#### Other information

Passenger and cargo aircraft	Allowed with restrictions.
Cargo aircraft only	Allowed with restrictions.

#### IMDG

UN number	UN2047
UN proper shipping name	DICHLOROPROPENES
Transport hazard class(es)	
Class	3
Subsidiary risk	-
Packing group	II
Environmental hazards	
Marine pollutant	No.
EmS	F-E, S-D
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not established.

#### DOT



#### IATA; IMDG



## 15. Regulatory information

**US federal regulations** This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

#### TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

#### CERCLA Hazardous Substance List (40 CFR 302.4)

1,1-Dichloropropene (CAS 563-58-6) Listed.

#### SARA 304 Emergency release notification

Not regulated.

#### OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

#### Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories	Immediate Hazard - Yes Delayed Hazard - No Fire Hazard - Yes Pressure Hazard - No Reactivity Hazard - No
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**SARA 302 Extremely hazardous substance**

Not listed.

**SARA 311/312 Hazardous chemical** Yes**SARA 313 (TRI reporting)**

Not regulated.

**Other federal regulations****Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List**

Not regulated.

**Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)**

Not regulated.

**Clean Water Act (CWA) Section 112(r) (40 CFR 68.130)** Hazardous substance  
Toxic pollutant**Safe Drinking Water Act (SDWA)** Not regulated.**US state regulations** California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.**International Inventories**

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	No
Canada	Domestic Substances List (DSL)	No
Canada	Non-Domestic Substances List (NDSL)	Yes
China	Inventory of Existing Chemical Substances in China (IECSC)	No
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)	No
New Zealand	New Zealand Inventory	No
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	No
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**

**Issue date** 11-19-2014  
**Revision date** 09-05-2018  
**Version #** 02  
**NFPA ratings** Health: 3  
Flammability: 3  
Instability: 0

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This document has undergone significant changes and should be reviewed in its entirety.

## Revision information

## 1,2,4-trimethylbenzene

Version number: GHS 2.0  
Replaces version of: 25.02.2016 (GHS 1)

Revision: 13.10.2017

### SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

#### 1.1 Product identifier

Identification of the substance	<b>1,2,4-trimethylbenzene</b>
Registration number (REACH)	01-2119472135-42-xxxx
EC number	202-436-9
Index No	-
CAS number	95-63-6
Additional relevant and available information	Pseudocumene

#### 1.2 Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	industrial use (SCC)
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#### 1.3 Details of the supplier of the safety data sheet

DHC Solvent Chemie GmbH  
Timmerhellstraße 28  
D-45478 Mülheim an der Ruhr  
Germany

Telephone: +49 (208) 9940-0  
Telefax: +49 (208) 9940-150

Competent person responsible for the safety data sheet

Vanessa Manz

e-mail (competent person)

productsafety@dhc-solvent.de

#### 1.4 Emergency telephone number

Emergency information service

Poison centre	
Country	Telephone
United Kingdom	+44 1235 239670

### SECTION 2: HAZARDS IDENTIFICATION

#### 2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 (CLP)

Hazard class	Category	Hazard class and category	Hazard statement
flammable liquid	Cat. 3	(Flam. Liq. 3)	H226
acute toxicity (inhal.)	Cat. 4	(Acute Tox. 4)	H332
skin corrosion/irritation	Cat. 2	(Skin Irrit. 2)	H315
serious eye damage/eye irritation	Cat. 2	(Eye Irrit. 2)	H319
specific target organ toxicity - single exposure (respiratory tract irritation)	Cat. 3	(STOT SE 3)	H335
aspiration hazard	Cat. 1	(Asp. Tox. 1)	H304
hazardous to the aquatic environment - chronic hazard	Cat. 2	(Aquatic Chronic 2)	H411

## 1,2,4-trimethylbenzene

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### Remarks

For full text of H-phrases: see SECTION 16.  
Substance with a community indicative occupational exposure limit value.

### The most important adverse physicochemical, human health and environmental effects

May be fatal if swallowed and enters airways.  
The product is combustible and can be ignited by potential ignition sources.

## 2.2 Label elements

### Labelling according to Regulation (EC) No 1272/2008 (CLP)

#### Signal word

**Danger**

#### Pictograms

GHS02, GHS07,  
GHS08, GHS09



### Hazard statements

H226	Flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H335	May cause respiratory irritation.
H411	Toxic to aquatic life with long lasting effects.

### Precautionary statements

#### Precautionary statements - prevention

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P243	Take action to prevent static discharges.
P273	Avoid release to the environment.
P280	Wear protective gloves/protective clothing/eye protection/face protection.

#### Precautionary statements - response

P301+P310	IF SWALLOWED: Immediately call a POISON CENTER/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.
P331	Do NOT induce vomiting.
P370+P378	In case of fire: Use sand, carbon dioxide or powder extinguisher to extinguish.

#### Precautionary statements - storage

P403+P233	Store in a well-ventilated place. Keep container tightly closed.
P403+P235	Store in a well-ventilated place. Keep cool.

#### Precautionary statements - disposal

P501	Dispose of contents/container in accordance with local/regional/national/international regulations.
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## 2.3 Other hazards

According to the results of its assessment, this substance is not a PBT or a vPvB.  
Vapour heavier than air, may form an explosive mixture in air: it may be ignited at some distance away from the spill resulting in flashbacks. Flowing product can create electrostatic charge, resulting sparks may ignite or cause an explosion.

## 1,2,4-trimethylbenzene

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### SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

#### 3.1 Substances

Name of substance	1,2,4-trimethylbenzene
Registration number (REACH)	01-2119472135-42-xxxx
EC number	202-436-9
CAS number	95-63-6
Index No	-
Molecular formula	C <sub>9</sub> H <sub>12</sub>

### SECTION 4: FIRST AID MEASURES

#### 4.1 Description of first aid measures

##### General notes

Do not leave affected person unattended. Remove victim out of the danger area. Keep affected person warm, still and covered. Take off immediately all contaminated clothing. In all cases of doubt, or when symptoms persist, seek medical advice. In case of unconsciousness place person in the recovery position. Never give anything by mouth.

##### Following inhalation

If breathing is irregular or stopped, immediately seek medical assistance and start first aid actions. Provide fresh air.

##### Following skin contact

Wash with plenty of soap and water.

##### Following eye contact

Irrigate copiously with clean, fresh water, holding the eyelids apart. Remove contact lenses, if present and easy to do. Continue rinsing. In all cases of doubt, or when symptoms persist, seek medical advice.

##### Following ingestion

Do NOT induce vomiting. Rinse mouth with water (only if the person is conscious).

#### 4.2 Most important symptoms and effects, both acute and delayed

Choking and suffocation risks. Deficits in perception and coordination, reaction time, or sleepiness.

#### 4.3 Indication of any immediate medical attention and special treatment needed

none

### SECTION 5: FIREFIGHTING MEASURES

#### 5.1 Extinguishing media

##### Suitable extinguishing media

carbon dioxide (CO<sub>2</sub>), BC-powder, foam, alcohol resistant foam, water mist

##### Unsuitable extinguishing media

water jet

#### 5.2 Special hazards arising from the substance or mixture

Solvent vapours are heavier than air and may spread along floors. In case of insufficient ventilation and/or in use, may form flammable/explosive vapour-air mixture. May produce toxic fumes of carbon monoxide if burning.

##### Hazardous combustion products

carbon monoxide (CO), carbon dioxide (CO<sub>2</sub>)

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### 5.3 Advice for firefighters

Wear breathing apparatus if exposed to vapours/dust/spray/gases. Co-ordinate firefighting measures to the fire surroundings. Do not allow firefighting water to enter drains or water courses. Collect contaminated firefighting water separately. Fight fire with normal precautions from a reasonable distance. Keep containers cool with water spray.

## SECTION 6: ACCIDENTAL RELEASE MEASURES

### 6.1 Personal precautions, protective equipment and emergency procedures

#### For non-emergency personnel

Remove persons to safety. Avoid inhaling sprayed product. Wearing of suitable protective equipment (including personal protective equipment referred to under Section 8 of the safety data sheet) to prevent any contamination of skin, eyes and personal clothing. Remove/take off immediately all contaminated clothing and wash it before reuse.

#### For emergency responders

Wear breathing apparatus if exposed to vapours/dust/spray/gases.

### 6.2 Environmental precautions

Keep away from drains, surface and ground water. Retain contaminated washing water and dispose of it. If substance has entered a water course or sewer, inform the responsible authority.

### 6.3 Methods and material for containment and cleaning up

#### Advices on how to contain a spill

Covering of drains.

#### Advices on how to clean up a spill

Wipe up with absorbent material (e.g. cloth, fleece). Collect spillage (sawdust, kieselgur (diatomite), sand, universal binder).

#### Appropriate containment techniques

Use of adsorbent materials. - covering of drains

#### Other information relating to spills and releases

Place in appropriate containers for disposal. Ventilate affected area.

### 6.4 Reference to other sections

Hazardous combustion products: see section 5. Personal protective equipment: see section 8. Incompatible materials: see section 10. Disposal considerations: see section 13.

## SECTION 7: HANDLING AND STORAGE

### 7.1 Precautions for safe handling

#### Recommendations

##### • Measures to prevent fire as well as aerosol and dust generation

Use only in well-ventilated areas. Use local and general ventilation. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting equipment. Use only non-sparking tools.

##### • Warning

Vapours are heavier than air, spread along floors and form explosive mixtures with air.

#### Advice on general occupational hygiene

Wash hands after use. Do not eat, drink and smoke in work areas. Remove contaminated clothing and protective equipment before entering eating areas. Never keep food or drink in the vicinity of chemicals. Never place chemicals in containers that are normally used for food or drink. Keep away from food, drink and animal feed-stuffs.

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### 7.2 Conditions for safe storage, including any incompatibilities

#### Managing of associated risks

##### • Explosive atmospheres

Keep container tightly closed and in a well-ventilated place. Use local and general ventilation. Keep cool. Protect from sunlight.

##### • Flammability hazards

Keep away from sources of ignition - No smoking. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Take precautionary measures against static discharge. Protect from sunlight.

#### Incompatible substances or mixtures

Observe hints for combined storage.

#### Consideration of other advice

##### • Ventilation requirements

Keep any substance that emits harmful vapours or gases in a place that allows these to be permanently extracted. Use local and general ventilation. Ground/bond container and receiving equipment.

##### • Packaging compatibilities

Only packagings which are approved (e.g. acc. to ADR) may be used.

Suitable materials and coatings for container/equipment: Carbon Steel, Stainless Steel, Polyester, Polytetrafluoroethylene (PTFE), Polyvinyl Alcohol (PVA)

Unsuitable Materials and Coatings for container/equipment: Butyl Rubber, Natural Rubber, Ethylene-propylene-diene monomer (EPDM), Polystyrene, Polyethylene, Polyacrylonitrile.

### 7.3 Specific end use(s)

See attached exposure scenarios

## SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

### 8.1 Control parameters

#### National limit values

#### Occupational exposure limit values (Workplace Exposure Limits)

Coun try	Name of agent	CAS No	Identifier	TWA [ppm]	TWA [mg/m <sup>3</sup> ]	STEL [ppm]	STEL [mg/m <sup>3</sup> ]	Source
DE	1,2,4-trimethylbenzene	95-63-6	AGW	20	100	40	200	TRGS 900
EU	1,2,4-trimethylbenzene	95-63-6	IOELV	20	100			2017/164/ EU
GB	aromatics	95-63-6	WEL		500			EH40/200 5
IE	1,2,4-trimethylbenzene	95-63-6	OELV	20	100			S.I. No. 619 of 2001

#### Notation

STEL Short-term exposure limit: a limit value above which exposure should not occur and which is related to a 15-minute period unless otherwise specified.

TWA Time-weighted average (long-term exposure limit): measured or calculated in relation to a reference period of 8 hours time-weighted average.

#### Relevant DNELs/DMELs/PNECs and other threshold levels



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### • human health values

Endpoint	Threshold level	Protection goal, route of exposure	Used in	Exposure time
DNEL	100 mg/m <sup>3</sup>	human, inhalatory	worker (industry)	acute - local effects
DNEL	100 mg/m <sup>3</sup>	human, inhalatory	worker (industry)	acute - systemic effects
DNEL	100 mg/m <sup>3</sup>	human, inhalatory	worker (industry)	chronic - local effects
DNEL	16,171 mg/kg	human, dermal	worker (industry)	chronic - systemic effects
DNEL	100 mg/m <sup>3</sup>	human, inhalatory	worker (industry)	chronic - systemic effects
DNEL	29.4 mg/m <sup>3</sup>	human, inhalatory	consumer (private households)	acute - systemic effects
DNEL	29.4 mg/m <sup>3</sup>	human, inhalatory	consumer (private households)	chronic - local effects
DNEL	15 mg/kg	human, oral	consumer (private households)	chronic - systemic effects
DNEL	9,512 mg/kg	human, dermal	consumer (private households)	chronic - systemic effects
DNEL	29.4 mg/m <sup>3</sup>	human, inhalatory	consumer (private households)	chronic - systemic effects

### • environmental values

End-point	Threshold level	Organism	Environmental compartment	Exposure time
PNEC	0.12 mg/l	aquatic organisms	freshwater	short-term (single instance)
PNEC	0.12 mg/l	aquatic organisms	marine water	short-term (single instance)
PNEC	2.41 mg/l	microorganisms	sewage treatment plant (STP)	short-term (single instance)
PNEC	13.56 mg/kg	benthic organisms	sediments	short-term (single instance)
PNEC	13.56 mg/kg	pelagic organisms	sediments	short-term (single instance)
PNEC	2.34 mg/kg	terrestrial organisms	soil	short-term (single instance)
PNEC	0.12 mg/l	aquatic organisms	water	intermittent release

## 8.2 Exposure controls

### Appropriate engineering controls

Technical measures and the appliance of appropriate working methods take priority over the use of personal protective equipment.

Safety and necessary control measures vary according to exposure conditions. Appropriate measures are:

Open windows, door, to allow sufficient ventilation. If this is not possible employ a fan to increase air exchange (see attached exposure scenarios).

### Individual protection measures (personal protective equipment)

#### Eye/face protection

Use safety goggle with side protection.

#### Skin protection

##### • hand protection

Wear suitable gloves. Chemical protection gloves are suitable, which are tested according to EN 374.

Short-term contact with the skin: Disposable gloves

Long-term contact with the skin: Gloves with long cuffs

Check leak-tightness/impermeability prior to use.

## 1,2,4-trimethylbenzene

Version number: GHS 2.0  
Replaces version of: 25.02.2016 (GHS 1)

Revision: 13.10.2017

- **type of material**

NBR: acrylonitrile-butadiene rubber, FKM: fluoro-elastomer

- **material thickness**

0,40 mm.

- **breakthrough times of the glove material**

>480 minutes (permeation: level 6)

- **other protection measures**

Take recovery periods for skin regeneration. Preventive skin protection (barrier creams/ointments) is recommended. Wash hands thoroughly after handling.

Body protection:

Suitable protective clothing: Flame resistant clothing

Suitable safety shoes: Anti static safety shoes according to EN 345 S3

### Respiratory protection

For activities in enclosed areas at elevated temperatures of the substance, local extraction or explosion protected ventilation equipment is recommended. In case this is not sufficient for the intended use, then apply a suitable respiratory protection according to EN 140 type A or better (see exposure scenarios). .

### Environmental exposure controls

Do not empty into drains.

## SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

### 9.1 Information on basic physical and chemical properties

#### Appearance

Physical state	liquid
Colour	colourless
Odour	characteristic

#### Other physical and chemical parameters

pH (value)	not determined
Melting point/freezing point	-43.77 °C
Initial boiling point and boiling range	169.4 °C at 101.3 kPa
Flash point	44 °C at 101.3 kPa
Explosive limits	
• lower explosion limit (LEL)	0.9 vol%
• upper explosion limit (UEL)	6.4 vol%
Vapour pressure	0.3 kPa at 25 °C
Density	0.88 g/cm <sup>3</sup> at 20 °C
Solubility(ies)	
Water solubility	57 mg/l at 25 °C
Partition coefficient	
n-octanol/water (log KOW)	This information is not available.
Auto-ignition temperature	500 °C
Viscosity	
• kinematic viscosity	0.843 mm <sup>2</sup> /s at 20 °C

## 1,2,4-trimethylbenzene

Version number: GHS 2.0  
Replaces version of: 25.02.2016 (GHS 1)

Revision: 13.10.2017

Explosive properties  
in use, may form flammable/explosive vapour-air mixture  
Oxidising properties none

### 9.2 Other information

## SECTION 10: STABILITY AND REACTIVITY

### 10.1 Reactivity

risk of ignition  
• if heated  
risk of ignition

### 10.2 Chemical stability

The material is stable under normal ambient and anticipated storage and handling conditions of temperature and pressure (see below "Conditions to avoid").

### 10.3 Possibility of hazardous reactions

No known hazardous reactions.

### 10.4 Conditions to avoid

Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

#### Hints to prevent fire or explosion

Use only non-sparking tools.

### 10.5 Incompatible materials

oxidisers

### 10.6 Hazardous decomposition products

No known hazardous decomposition products.

## SECTION 11: TOXICOLOGICAL INFORMATION

### 11.1 Information on toxicological effects

Classification according to GHS (1272/2008/EC, CLP)

#### Acute toxicity

Harmful if inhaled.

#### • Acute toxicity estimate (ATE)

inhalation: vapour 11 mg<sub>i</sub>/4h

Exposure route	Endpoint	Value	Species
oral	LD50	6,000 mg/kg	rat

#### Skin corrosion/irritation

Causes skin irritation.

#### Serious eye damage/eye irritation

Causes serious eye irritation.

#### Respiratory or skin sensitisation

Shall not be classified as a respiratory or skin sensitiser.

## 1,2,4-trimethylbenzene

Version number: GHS 2.0  
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### Summary of evaluation of the CMR properties

Shall not be classified as germ cell mutagenic, carcinogenic nor as a reproductive toxicant.

### Specific target organ toxicity (STOT)

#### • Specific target organ toxicity - single exposure

May cause respiratory irritation.

#### • Specific target organ toxicity - repeated exposure

Shall not be classified as a specific target organ toxicant (repeated exposure).

### Aspiration hazard

May be fatal if swallowed and enters airways.

### Information on likely routes of exposure

If on skin. If inhaled.

## SECTION 12: ECOLOGICAL INFORMATION

### 12.1 Toxicity

#### Aquatic toxicity (acute)

Endpoint	Value	Species	Exposure time
LC50	7.72 mg/l	fish	96 h
EC50	2.356 mg/l	algae	96 h

#### Aquatic toxicity (chronic)

May cause long-term adverse effects in the aquatic environment.

### 12.2 Persistence and degradability

Data are not available.

### 12.3 Bioaccumulative potential

Data are not available.

#### BCF

243

### 12.4 Mobility in soil

Data are not available.

### 12.5 Results of PBT and vPvB assessment

According to the results of its assessment, this substance is not a PBT or a vPvB.

### 12.6 Other adverse effects

Data are not available.

## SECTION 13: DISPOSAL CONSIDERATIONS

### 13.1 Waste treatment methods

#### Waste treatment-relevant information

Solvent reclamation/regeneration.

#### Sewage disposal-relevant information

Do not empty into drains.

#### Waste treatment of containers/packagings

Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately re-conditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

## 1,2,4-trimethylbenzene

Version number: GHS 2.0  
Replaces version of: 25.02.2016 (GHS 1)

Revision: 13.10.2017

### List of wastes

Proposed waste code(s) for the used product:  
07 01 04x Other organic solvents, washing liquids and mother liquors

### Remarks

Please consider the relevant national or regional provisions. Waste shall be separated into the categories that can be handled separately by the local or national waste management facilities.

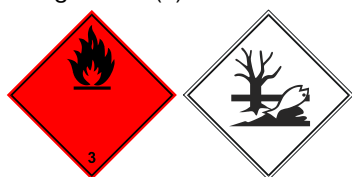
## SECTION 14: TRANSPORT INFORMATION

- |             |   |   |
|-------------|---|---|
| <b>14.1</b> | UN number   | <b>1993</b>   |
| <b>14.2</b> | UN proper shipping name<br>Technical name   | <b>FLAMMABLE LIQUID, N.O.S.</b><br>1,2,4-trimethylbenzene |
| <b>14.3</b> | Transport hazard class(es)<br>Class   | 3 (flammable liquids)                                     |
| <b>14.4</b> | Packing group   | III (substance presenting low danger)                     |
| <b>14.5</b> | Environmental hazards   | hazardous to the aquatic environment                      |
| <b>14.6</b> | Special precautions for user<br>Provisions for dangerous goods (ADR) should be complied within the premises.                  |   |
| <b>14.7</b> | <b>Transport in bulk according to Annex II of MARPOL and the IBC Code</b><br>The cargo is not intended to be carried in bulk. |   |

### Information for each of the UN Model Regulations

#### • Transport of dangerous goods by road, rail and inland waterway (ADR/RID/ADN)

UN number	1993
Proper shipping name	FLAMMABLE LIQUID, N.O.S.
Technical name (hazardous constituents)	1,2,4-trimethylbenzene
Class	3
Classification code	F1
Packing group	III
Danger label(s)	3 + "fish and tree"



Environmental hazards	yes (hazardous to the aquatic environment)
Special provisions (SP)	274, 601
Excepted quantities (EQ)	E1
Limited quantities (LQ)	5 L
Transport category (TC)	3
Tunnel restriction code (TRC)	D/E
Hazard identification No	30
<b>Emergency Action Code</b>	3YE

#### • International Maritime Dangerous Goods Code (IMDG)

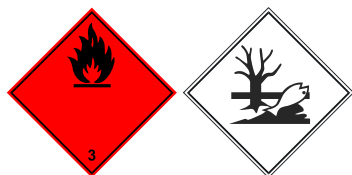
UN number	1993
Proper shipping name	FLAMMABLE LIQUID, N.O.S.
Particulars in the shipper's declaration	UN1993, FLAMMABLE LIQUID, N.O.S., (1,2,4-trimethylbenzene), 3, III, 44°C c.c., MARINE POLLUTANT
Class	3

## 1,2,4-trimethylbenzene

Version number: GHS 2.0  
Replaces version of: 25.02.2016 (GHS 1)

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Marine pollutant	yes (hazardous to the aquatic environment)
Packing group	III
Danger label(s)	3 + "fish and tree"



Special provisions (SP)	223, 274, 955
Excepted quantities (EQ)	E1
Limited quantities (LQ)	5 L
EmS	F-E, S-E
Stowage category	A
<b>• International Civil Aviation Organization (ICAO-IATA/DGR)</b>	
UN number	1993
Proper shipping name	Flammable liquid, n.o.s.
Class	3
Environmental hazards	yes (hazardous to the aquatic environment)
Packing group	III
Danger label(s)	3



Special provisions (SP)	A3
Excepted quantities (EQ)	E1
Limited quantities (LQ)	10 L

## SECTION 15: REGULATORY INFORMATION

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

**Relevant provisions of the European Union (EU)**

**• Restrictions according to REACH, Annex XVII**

Name of substance	CAS No	Wt%	Type of registration	No
1,2,4-trimethylbenzene		100	1907/2006/EC annex XVII	3
1,2,4-trimethylbenzene		100	1907/2006/EC annex XVII	40

**• List of substances subject to authorisation (REACH, Annex XIV)**

not listed

**• 2012/18/EU (Seveso III)**

No	Dangerous substance/hazard categories	Qualifying quantity (tonnes) for the application of lower and upper-tier requirements		Notes
E2	environmental hazards (hazardous to the aquatic environment, cat. 2)	200	500	57)

**Notation**

57) Hazardous to the Aquatic Environment in category Chronic 2.

## 1,2,4-trimethylbenzene

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**• Limitation of emissions of volatile organic compounds due to the use of organic solvents in certain paints and varnishes and vehicle refinishing products (2004/42/EC, Deco-Paint Directive)**

VOC content 100 %

**• Directive on industrial emissions (VOCs, 2010/75/EU)**

VOC content 100 %

**• Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS) - Annex II**

not listed

**• Regulation 166/2006/EC concerning the establishment of a European Pollutant Release and Transfer Register (PRTR)**

not listed

**• Directive 2000/60/EC establishing a framework for Community action in the field of water policy (WFD)**

not listed

**National inventories**

Country	Inventory	Status
AU	AICS	substance is listed
CA	DSL	substance is listed
CN	IECSC	substance is listed
EU	ECSI	substance is listed
EU	REACH Reg.	substance is listed
JP	CSCL-ENCS	substance is listed
KR	KECI	substance is listed
MX	INSQ	substance is listed
NZ	NZIoC	substance is listed
PH	PICCS	substance is listed
TR	CICR	substance is listed
TW	TCSI	substance is listed
US	TSCA	substance is listed

**Legend**

AICS Australian Inventory of Chemical Substances.  
CICR Chemical Inventory and Control Regulation.  
CSCL-ENCS List of Existing and New Chemical Substances (CSCL-ENCS).  
DSL Domestic Substances List (DSL).  
ECSI EC Substance Inventory (EINECS, ELINCS, NLP).  
IECSC Inventory of Existing Chemical Substances Produced or Imported in China.  
INSQ National Inventory of Chemical Substances.  
KECI Korea Existing Chemicals Inventory.  
NZIoC New Zealand Inventory of Chemicals.  
PICCS Philippine Inventory of Chemicals and Chemical Substances.  
REACH Reg. REACH registered substances.  
TCSI Taiwan Chemical Substance Inventory.  
TSCA Toxic Substance Control Act.

## 1,2,4-trimethylbenzene

Version number: GHS 2.0  
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### 15.2 Chemical Safety Assessment

For this substance a chemical safety assessment has been carried out.

## SECTION 16: OTHER INFORMATION

### 16.1 Indication of changes (revised safety data sheet)

Section	Former entry (text/value)	Actual entry (text/value)
1.3	Competent person responsible for the safety data sheet: Christian Knappe	Competent person responsible for the safety data sheet: Vanessa Manz
1.4		Poison centre: change in the listing (table)
2.2		Precautionary statements - prevention: change in the listing (table)
2.2		Precautionary statements - disposal: change in the listing (table)
6.2	Environmental precautions: Keep away from drains, surface and ground water. Retain contaminated washing water and dispose of it.	Environmental precautions: Keep away from drains, surface and ground water. Retain contaminated washing water and dispose of it. If substance has entered a water course or sewer, inform the responsible authority.
8.1		Occupational exposure limit values (Workplace Exposure Limits): change in the listing (table)
11.1		Information on likely routes of exposure: If on skin. If inhaled.
15.1		• Restrictions according to REACH, Annex XVII: change in the listing (table)
15.1		National inventories: change in the listing (table)
16		Abbreviations and acronyms: change in the listing (table)
16	Key literature references and sources for data: - Regulation (EC) No. 1907/2006 (REACH), amended by 2015/830/EU - Regulation (EC) No. 1272/2008 (CLP, EU GHS) - See attached exposure scenarios <a href="http://www.dhc-solvent.de/dhc_sdbreach.html">http://www.dhc-solvent.de/dhc_sdbreach.html</a>  <a href="http://www.dhc-solvent.de/en/dhc_sdbreach.html">http://www.dhc-solvent.de/en/dhc_sdbreach.html</a> Transport of dangerous goods by road, rail and inland waterway (ADR/RID/ADN). International Maritime Dangerous Goods Code (IMDG). International Air Transport Association (IATA).	Key literature references and sources for data: - Regulation (EC) No. 1907/2006 (REACH), amended by 2015/830/EU - Regulation (EC) No. 1272/2008 (CLP, EU GHS) - The exposure scenarios are available at <a href="http://www.dhc-solvent.de">www.dhc-solvent.de</a> in the Service section. Transport of dangerous goods by road, rail and inland waterway (ADR/RID/ADN). International Maritime Dangerous Goods Code (IMDG). International Air Transport Association (IATA).
16		Disclaimer: This information is based upon the present state of our knowledge. This SDS has been compiled and is solely intended for this product. The information concerning legal regulations can lay no claim to completeness. In addition to this, other provisions may also apply to the product.

### Abbreviations and acronyms

Abbr.	Descriptions of used abbreviations
2017/164/EU	Commission Directive establishing a fourth list of indicative occupational exposure limit values pursuant to Council Directive 98/24/EC, and amending Commission Directives 91/322/EEC, 2000/39/EC and 2009/161/EU
ADN	Accord européen relatif au transport international des marchandises dangereuses par voies de navigation intérieures (European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways)
ADR	Accord européen relatif au transport international des marchandises dangereuses par route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
AGW	Workplace exposure limit



## 1,2,4-trimethylbenzene

Version number: GHS 2.0  
Replaces version of: 25.02.2016 (GHS 1)

Revision: 13.10.2017

Abbr.	Descriptions of used abbreviations
BCF	Bioconcentration factor
CAS	Chemical Abstracts Service (service that maintains the most comprehensive list of chemical substances)
CLP	Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures
CMR	Carcinogenic, Mutagenic or toxic for Reproduction
DGR	Dangerous Goods Regulations (see IATA/DGR)
DMEL	Derived Minimal Effect Level
DNEL	Derived No-Effect Level
EH40/2005	EH40/2005 Workplace exposure limits ( <a href="http://www.nationalarchives.gov.uk/doc/open-government-licence/">http://www.nationalarchives.gov.uk/doc/open-government-licence/</a> )
EINECS	European Inventory of Existing Commercial Chemical Substances
ELINCS	European List of Notified Chemical Substances
EmS	Emergency Schedule
GHS	"Globally Harmonized System of Classification and Labelling of Chemicals" developed by the United Nations
IATA	International Air Transport Association
IATA/DGR	Dangerous Goods Regulations (DGR) for the air transport (IATA)
ICAO	International Civil Aviation Organization
IMDG	International Maritime Dangerous Goods Code
index No	The Index number is the identification code given to the substance in Part 3 of Annex VI to Regulation (EC) No 1272/2008
IOELV	Indicative occupational exposure limit value
MARPOL	International Convention for the Prevention of Pollution from Ships (abbr. of "Marine Pollutant")
NLP	No-Longer Polymer
PBT	Persistent, Bioaccumulative and Toxic
PNEC	Predicted No-Effect Concentration
ppm	Parts per million
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
RID	Règlement concernant le transport International ferroviaire des marchandises Dangereuses (Regulations concerning the International carriage of Dangerous goods by Rail)
S.I. No. 619 of 2001	Safety, Health and Welfare at Work (Chemical Agents) Regulations 2001
STEL	Short-term exposure limit
TRGS 900	Arbeitsplatzgrenzwerte (TRGS 900)
TWA	Time-weighted average
VOC	Volatile Organic Compounds
vPvB	Very Persistent and very Bioaccumulative
WEL	Workplace exposure limit

## 1,2,4-trimethylbenzene

Version number: GHS 2.0  
Replaces version of: 25.02.2016 (GHS 1)

Revision: 13.10.2017

### Key literature references and sources for data

- Regulation (EC) No. 1907/2006 (REACH), amended by 2015/830/EU
- Regulation (EC) No. 1272/2008 (CLP, EU GHS)
- The exposure scenarios are available at [www.dhc-solvent.de](http://www.dhc-solvent.de) in the Service section.

Transport of dangerous goods by road, rail and inland waterway (ADR/RID/ADN).  
International Maritime Dangerous Goods Code (IMDG).  
International Air Transport Association (IATA).

### List of relevant phrases (code and full text as stated in chapter 2 and 3)

Code	Text
H226	Flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H335	May cause respiratory irritation.
H411	Toxic to aquatic life with long lasting effects.

### Disclaimer

This information is based upon the present state of our knowledge. This SDS has been compiled and is solely intended for this product. The information concerning legal regulations can lay no claim to completeness. In addition to this, other provisions may also apply to the product.

## SAFETY DATA SHEET

Creation Date 26-Sep-2009

Revision Date 18-Jan-2018

Revision Number 4

### 1. Identification

**Product Name** Mesitylene

**Cat No. :** AC161320000; AC161320010; AC161320025; AC161320050;  
AC161322500

**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  
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  
May cause drowsiness or dizziness



### 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  
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

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 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 CO<sub>2</sub>, 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	97-99

#### 4. First-aid measures

<b>General Advice</b>	If symptoms persist, call a physician.
<b>Eye Contact</b>	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.
<b>Skin Contact</b>	Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Get medical attention.
<b>Inhalation</b>	Remove to fresh air. If breathing is difficult, give oxygen. Get medical attention. Risk of serious damage to the lungs (by aspiration).
<b>Ingestion</b>	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.
<b>Most important symptoms and effects</b>	. Difficulty in breathing. Vapors may cause drowsiness and dizziness: Symptoms may be delayed: Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting
<b>Notes to Physician</b>	Treat symptomatically

#### 5. Fire-fighting measures

<b>Suitable Extinguishing Media</b>	Water spray, carbon dioxide (CO <sub>2</sub> ), dry chemical, alcohol-resistant foam. Water mist may be used to cool closed containers.
<b>Unsuitable Extinguishing Media</b>	No information available
<b>Flash Point</b>	44 °C / 111.2 °F
<b>Method -</b>	No information available
<b>Autoignition Temperature</b>	550 °C / 1022 °F
<b>Explosion Limits</b>	
<b>Upper</b>	6.00%
<b>Lower</b>	1.00%
<b>Sensitivity to Mechanical Impact</b>	No information available
<b>Sensitivity to Static Discharge</b>	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<sub>2</sub>).

**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**  
3

**Flammability**  
2

**Instability**  
0

**Physical hazards**  
N/A

#### 6. Accidental release measures

<b>Personal Precautions</b>	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. See Section 12 for additional Ecological Information. 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/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. Use spark-proof tools and explosion-proof equipment.

**Storage** Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat, sparks and flame. Flammables area.

## 8. Exposure controls / personal protection

### Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
1,3,5-Trimethylbenzene			TWA: 25 ppm TWA: 125 mg/m <sup>3</sup>	

### Legend

NIOSH IDLH: 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.

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

## 9. Physical and chemical properties

<b>Physical State</b>	Liquid
<b>Appearance</b>	Colorless
<b>Odor</b>	aromatic
<b>Odor Threshold</b>	No information available
<b>pH</b>	No information available
<b>Melting Point/Range</b>	-45 °C / -49 °F
<b>Boiling Point/Range</b>	163 - 166 °C / 325.4 - 330.8 °F @ 760 mmHg
<b>Flash Point</b>	44 °C / 111.2 °F
<b>Evaporation Rate</b>	No information available
<b>Flammability (solid,gas)</b>	Not applicable
<b>Flammability or explosive limits</b>	
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
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

<b>Reactive Hazard</b>	None known, based on information available
<b>Stability</b>	Stable under normal conditions.
<b>Conditions to Avoid</b>	Incompatible products. Excess heat. Keep away from open flames, hot surfaces and sources of ignition.
<b>Incompatible Materials</b>	Strong oxidizing agents, Nitric acid
<b>Hazardous Decomposition Products</b>	Carbon monoxide (CO), Carbon dioxide (CO <sub>2</sub> )
<b>Hazardous Polymerization</b>	Hazardous polymerization does not occur.
<b>Hazardous Reactions</b>	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
1,3,5-Trimethylbenzene	LD50 = 5000 mg/kg ( Rat )	Not listed	LC50 = 24 g/m <sup>3</sup> ( Rat ) 4 h

**Toxicologically Synergistic Products** No information available

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

<b>Irritation</b>	Irritating to eyes, respiratory system and skin
<b>Sensitization</b>	No information available
<b>Carcinogenicity</b>	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	EC50: = 50 mg/L, 24h (Daphnia magna)

**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 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 - 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), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDSL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
1,3,5-Trimethylbenzene	108-67-8	X	-	203-604-4	X	X	X	X	KE-34411

**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 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

**16. Other information**

Prepared By Regulatory Affairs  
Thermo Fisher Scientific  
Email: EMSDS.RA@thermofisher.com

Creation Date 26-Sep-2009

Revision Date 18-Jan-2018

Print Date 18-Jan-2018

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**

Creation Date 05-May-2009

Revision Date 18-Jan-2018

Revision Number 3

**1. Identification**

**Product Name** 1,4-Dioxane

**Cat No. :** D111-4; D111-4LC; D111-500; D56S-4; D116-4; D116-200

**CAS-No** 123-91-1  
**Synonyms** Diox

**Recommended Use** Laboratory chemicals.  
**Uses advised against** Not for food, drug, pesticide or biocidal product use

**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)

Flammable liquids	Category 2
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), Eyes.	
Specific target organ toxicity - (repeated exposure)	Category 2
Target Organs - Kidney, Liver.	

**Label Elements****Signal Word**

Danger

**Hazard Statements**

Highly flammable liquid and vapor  
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  
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 CO<sub>2</sub>, 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)**

May form explosive peroxides  
Repeated exposure may cause skin dryness or cracking  
**WARNING.** Cancer - <https://www.p65warnings.ca.gov/>.

### 3. Composition/Information on Ingredients

Component	CAS-No	Weight %
1,4-Dioxane	123-91-1	>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.

<b>Inhalation</b>	Move 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. Immediate medical attention is required.
<b>Ingestion</b>	Do not induce vomiting. Call a physician or Poison Control Center immediately.
<b>Most important symptoms and effects</b>	Breathing difficulties. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting
<b>Notes to Physician</b>	Treat symptomatically

## 5. Fire-fighting measures

<b>Suitable Extinguishing Media</b>	Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide. Cool closed containers exposed to fire with water spray.
<b>Unsuitable Extinguishing Media</b>	Water may be ineffective
<b>Flash Point</b>	12 °C / 53.6 °F
<b>Method -</b>	No information available
<b>Autoignition Temperature</b>	355 °C / 671 °F
<b>Explosion Limits</b>	
<b>Upper</b>	22%
<b>Lower</b>	2%
<b>Sensitivity to Mechanical Impact</b>	No information available
<b>Sensitivity to Static Discharge</b>	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. May form explosive peroxides. Vapors may form explosive mixtures with air.

### Hazardous Combustion Products

Carbon monoxide (CO) Carbon dioxide (CO<sub>2</sub>) peroxides

### 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

<b>Health</b>	<b>Flammability</b>	<b>Instability</b>	<b>Physical hazards</b>
2	3	1	N/A

## 6. Accidental release measures

<b>Personal Precautions</b>	Remove all sources of ignition. Use personal protective equipment. Take precautionary measures against static discharges. Do not get in eyes, on skin, or on clothing. Ensure adequate ventilation.
<b>Environmental Precautions</b>	Should not be released into the environment. See Section 12 for additional ecological information.
<b>Methods for Containment and Clean Up</b>	Remove all sources of ignition. Soak up with inert absorbent material. Take precautionary measures against static discharges. Keep in suitable, closed containers for disposal. Use spark-proof tools and explosion-proof equipment.

## 7. Handling and storage

<b>Handling</b>	Wear personal protective equipment. Ensure adequate ventilation. Handle under an inert atmosphere. Keep away from open flames, hot surfaces and sources of ignition. Do not breathe vapors or spray mist. Do not get in eyes, on skin, or on clothing. Take precautionary measures against static discharges. If peroxide formation is suspected, do
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not open or move container. Use only non-sparking tools. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded. Wash hands before breaks and immediately after handling the product.

**Storage**

Keep containers tightly closed in a dry, cool and well-ventilated place. Store under an inert atmosphere. Flammables area. May form explosive peroxides. Containers should be dated when opened and tested periodically for the presence of peroxides. Should crystals form in a peroxidizable liquid, peroxidation may have occurred and the product should be considered extremely dangerous. In this instance, the container should only be opened remotely by professionals. Keep away from heat and sources of ignition.

## 8. Exposure controls / personal protection

**Exposure Guidelines**

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
1,4-Dioxane	TWA: 20 ppm Skin	(Vacated) TWA: 25 ppm (Vacated) TWA: 90 mg/m <sup>3</sup> Skin TWA: 100 ppm TWA: 360 mg/m <sup>3</sup>	IDLH: 500 ppm Ceiling: 1 ppm Ceiling: 3.6 mg/m <sup>3</sup>	TWA: 25 ppm TWA: 90 mg/m <sup>3</sup> STEL: 100 ppm STEL: 360 mg/m <sup>3</sup>

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. Use explosion-proof electrical/ventilating/lighting/equipment. 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**

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	Liquid
Appearance	Colorless
Odor	Petroleum distillates
Odor Threshold	No information available
pH	6-8 500 g/l aq.sol
Melting Point/Range	12 °C / 53.6 °F
Boiling Point/Range	101 °C / 213.8 °F @ 760 mmHg
Flash Point	12 °C / 53.6 °F
Evaporation Rate	No information available
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	22%
Lower	2%

Vapor Pressure	41 mbar @ 20 °C
Vapor Density	3
Specific Gravity	1.034
Solubility	Soluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	355 °C / 671 °F
Decomposition Temperature	No information available
Viscosity	1.32 mPa.s @ 20 °C
Molecular Formula	C4 H8 O2
Molecular Weight	88.11

## 10. Stability and reactivity

Reactive Hazard	None known, based on information available
Stability	May form explosive peroxides. Hygroscopic.
Conditions to Avoid	Incompatible products. Heat, flames and sparks. Exposure to air or moisture over prolonged periods. Keep away from open flames, hot surfaces and sources of ignition.
Incompatible Materials	Strong oxidizing agents, Reducing agents, Halogens
Hazardous Decomposition Products	Carbon monoxide (CO), Carbon dioxide (CO <sub>2</sub> ), peroxides
Hazardous Polymerization	Hazardous polymerization does not occur.
Hazardous Reactions	May form explosive peroxides.

## 11. Toxicological information

### Acute Toxicity

#### Product Information Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
1,4-Dioxane	5170 mg/kg ( Rat ) 4200 mg/kg ( Rat )	LD50 = 7600 mg/kg ( Rabbit )	48.5 mg/L ( Rat ) 4 h

**Toxicologically Synergistic Products** Acetonitrile; Tetrachloroethylene

#### 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
1,4-Dioxane	123-91-1	Group 2B	Reasonably Anticipated	A3	X	Not listed

IARC: (International Agency for Research on Cancer)

NTP: (National Toxicity Program)

ACGIH: (American Conference of Governmental Industrial Hygienists)

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)

Known - Known Carcinogen

Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen

A1 - Known Human Carcinogen

A2 - Suspected Human Carcinogen

A3 - Animal Carcinogen

ACGIH: (American Conference of Governmental Industrial Hygienists)

<b>Mutagenic Effects</b>	No information available
<b>Reproductive Effects</b>	No information available.
<b>Developmental Effects</b>	No information available.
<b>Teratogenicity</b>	No information available.
<b>STOT - single exposure</b>	Respiratory system Central nervous system (CNS) Eyes
<b>STOT - repeated exposure</b>	Kidney Liver
<b>Aspiration hazard</b>	No information available
<b>Symptoms / effects, both acute and delayed</b>	Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting
<b>Endocrine Disruptor Information</b>	No information available
<b>Other Adverse Effects</b>	See actual entry in RTECS for complete information.

## 12. Ecological information

### Ecotoxicity

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
1,4-Dioxane	Not listed	LC50: = 9850 mg/L, 96h (Pimephales promelas) LC50: 10306 - 14742 mg/L, 96h static (Pimephales promelas) LC50: = 9850 mg/L, 96h flow-through (Pimephales promelas) LC50: > 10000 mg/L, 96h semi-static (Lepomis macrochirus) LC50: > 10000 mg/L, 96h static (Lepomis macrochirus)	EC50 = 610 mg/L 5 min EC50 = 668 mg/L 15 min EC50 = 733 mg/L 30 min	EC50 = 163 mg/L 48h

**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.

Component	log Pow
1,4-Dioxane	-0.42

## 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
1,4-Dioxane - 123-91-1	U108	-

## 14. Transport information

### DOT

**UN-No** UN1165  
**Proper Shipping Name** DIOXANE



<b>Hazard Class</b>	3
<b>Packing Group</b>	II
<b>TDG</b>	
<b>UN-No</b>	UN1165
<b>Proper Shipping Name</b>	DIOXANE
<b>Hazard Class</b>	3
<b>Packing Group</b>	II
<b>IATA</b>	
<b>UN-No</b>	UN1165
<b>Proper Shipping Name</b>	DIOXANE
<b>Hazard Class</b>	3
<b>Packing Group</b>	II
<b>IMDG/IMO</b>	
<b>UN-No</b>	UN1165
<b>Proper Shipping Name</b>	DIOXANE
<b>Hazard Class</b>	3
<b>Packing Group</b>	II

## 15. Regulatory information

### International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
1,4-Dioxane	X	X	-	204-661-8	-		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 %
1,4-Dioxane	123-91-1	>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
1,4-Dioxane	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
1,4-Dioxane	100 lb	-

**California Proposition 65** This product contains the following proposition 65 chemicals

Component	CAS-No	California Prop. 65	Prop 65 NSRL	Category
1,4-Dioxane	123-91-1	Carcinogen	30 µg/day	Carcinogen

**U.S. State Right-to-Know Regulations**

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
1,4-Dioxane	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**16. Other information**

**Prepared By** Regulatory Affairs  
Thermo Fisher Scientific  
Email: EMSDS.RA@thermofisher.com

**Creation Date** 05-May-2009  
**Revision Date** 18-Jan-2018  
**Print Date** 18-Jan-2018

**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

Creation Date 04-Jun-2010

Revision Date 19-Jan-2018

Revision Number 3

### 1. Identification

**Product Name** Acenaphthene

**Cat No. :** AC201340000; AC201340050; AC201341000; AC201345000

**CAS-No** 83-32-9

**Synonyms** 1,2-Dihydroacenaphthylene; Naphthyleneethylene; 1,8-Ethylenenaphthalene

**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	Acros Organics
One Reagent Lane	One Reagent Lane
Fair Lawn, NJ 07410	Fair Lawn, NJ 07410
Tel: (201) 796-7100	

**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 - Respiratory system.	

**Label Elements**

**Signal Word**

Warning

**Hazard Statements**

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

**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

**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

### 3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Acenaphthene	83-32-9	>95

### 4. First-aid measures

<b>Eye Contact</b>	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.
<b>Skin Contact</b>	Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Get medical attention.
<b>Inhalation</b>	Remove from exposure, lie down. Remove to fresh air. If not breathing, give artificial respiration. Get medical attention.
<b>Ingestion</b>	Clean mouth with water. Get medical attention.
<b>Most important symptoms and effects</b>	No information available.
<b>Notes to Physician</b>	Treat symptomatically

### 5. Fire-fighting measures

**Suitable Extinguishing Media** Water spray. Carbon dioxide (CO<sub>2</sub>). Dry chemical. Chemical foam.

**Unsuitable Extinguishing Media** No information available

**Flash Point** 135 °C / 275 °F

**Method -** No information available

**Autoignition Temperature** 450 °C / 842 °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**

Do not allow run-off from fire-fighting to enter drains or water courses.

**Hazardous Combustion Products**

Carbon monoxide (CO). Carbon dioxide (CO<sub>2</sub>).

**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**  
2

**Flammability**  
1

**Instability**  
0

**Physical hazards**  
N/A

## 6. Accidental release measures

**Personal Precautions** Ensure adequate ventilation. Use personal protective equipment as required.

**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.

## 7. Handling and storage

**Handling** Avoid contact with skin and eyes. Do not breathe dust.

**Storage** Keep in a dry, cool and well-ventilated place. Refer product specification and/or product label for specific storage temperature requirement. 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.

<b>Skin and body protection</b>	Wear appropriate protective gloves and clothing to prevent skin exposure.
<b>Respiratory Protection</b>	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.
<b>Hygiene Measures</b>	Handle in accordance with good industrial hygiene and safety practice.

## 9. Physical and chemical properties

<b>Physical State</b>	Solid
<b>Appearance</b>	Brown
<b>Odor</b>	No information available
<b>Odor Threshold</b>	No information available
<b>pH</b>	Not applicable
<b>Melting Point/Range</b>	90 - 95 °C / 194 - 203 °F
<b>Boiling Point/Range</b>	279 °C / 534.2 °F
<b>Flash Point</b>	135 °C / 275 °F
<b>Evaporation Rate</b>	Not applicable
<b>Flammability (solid,gas)</b>	No information available
<b>Flammability or explosive limits</b>	
Upper	No data available
Lower	No data available
<b>Vapor Pressure</b>	10 mmHg @ 131 °C
<b>Vapor Density</b>	Not applicable
<b>Specific Gravity</b>	1.060
<b>Solubility</b>	insoluble
<b>Partition coefficient; n-octanol/water</b>	No data available
<b>Autoignition Temperature</b>	450 °C / 842 °F
<b>Decomposition Temperature</b>	No information available
<b>Viscosity</b>	Not applicable
<b>Molecular Formula</b>	C <sub>12</sub> H <sub>10</sub>
<b>Molecular Weight</b>	154.21

## 10. Stability and reactivity

<b>Reactive Hazard</b>	None known, based on information available
<b>Stability</b>	Stable under normal conditions.
<b>Conditions to Avoid</b>	Excess heat. Incompatible products.
<b>Incompatible Materials</b>	Strong oxidizing agents, Metals, Strong acids
<b>Hazardous Decomposition Products</b>	Carbon monoxide (CO), Carbon dioxide (CO <sub>2</sub> )
<b>Hazardous Polymerization</b>	No information available.
<b>Hazardous Reactions</b>	None under normal processing.

## 11. Toxicological information

### Acute Toxicity

#### Product Information Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Acenaphthene	LD50 = 10000 mg/kg ( Rat )	Not listed	Not listed

<b>Toxicologically Synergistic</b>	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
Acenaphthene	83-32-9	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** 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**

The product contains following substances which are hazardous for the environment. Very toxic to aquatic organisms.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Acenaphthene	EC50: 0.23 - 1.15 mg/L, 96h (Pseudokirchneriella subcapitata)	LC50: 1.3 - 2.1 mg/L, 96h static (Lepomis macrochirus) LC50: = 0.509 mg/L, 96h flow-through (Pimephales promelas) LC50: 0.6 - 0.75 mg/L, 96h flow-through (Oncorhynchus mykiss)	EC50 = 0.58 mg/L 15 min	EC50: 1.102 - 1.475 mg/L, 48h Static (Daphnia magna) EC50: = 3.45 mg/L, 48h (Daphnia magna) EC50: = 41 mg/L, 48h (Daphnia magna)

**Persistence and Degradability** May persist

**Bioaccumulation/ Accumulation** No information available.

**Mobility** Is not likely mobile in the environment due its low water solubility.

Component	log Pow
Acenaphthene	4.43

## 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 substances, solid, n.o.s.  
 Technical Name Acenaphthene  
 Hazard Class 9  
 Packing Group III

**TDG**

UN-No UN3077  
 Proper Shipping Name Environmentally hazardous substances, solid, n.o.s.  
 Hazard Class 9  
 Packing Group III

**IATA**

UN-No UN3077  
 Proper Shipping Name Environmentally hazardous substances, solid, n.o.s.  
 Hazard Class 9  
 Packing Group III

**IMDG/IMO**

UN-No UN3077  
 Proper Shipping Name Environmentally hazardous substances, solid, n.o.s.  
 Hazard Class 9  
 Packing Group III

## 15. Regulatory information

**United States of America Inventory**

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
Acenaphthene	83-32-9	X	ACTIVE	-

**Legend:**

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/NDL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
Acenaphthene	83-32-9	X	-	201-469-6	X	X	X	X	KE-10602

**U.S. Federal Regulations**

SARA 313 Not applicable

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Acenaphthene	83-32-9	>95	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
Acenaphthene	-	-	X	X

Clean Air Act Not applicable

OSHA - Occupational Safety and Not applicable



Health Administration

**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
Acenaphthene	100 lb	-

**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
Acenaphthene	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

**16. Other information**

**Prepared By** Regulatory Affairs  
Thermo Fisher Scientific  
Email: EMSDS.RA@thermofisher.com

**Creation Date** 04-Jun-2010

**Revision Date** 19-Jan-2018

**Print Date** 19-Jan-2018

**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 5.6  
Revision Date 05/24/2016  
Print Date 01/23/2017

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**1. PRODUCT AND COMPANY IDENTIFICATION****1.1 Product identifiers**

Product name : Acenaphthylene

Product Number : 416703  
Brand : Aldrich

CAS-No. : 208-96-8

**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)**

Acute toxicity, Oral (Category 4), H302

Skin irritation (Category 2), H315

Eye irritation (Category 2A), H319

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

Warning

Hazard statement(s)

H302

Harmful if swallowed.

H315

Causes skin irritation.

H319

Causes serious eye irritation.

H335

May cause respiratory irritation.

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.

P280

Wear eye protection/ face protection.

P280	Wear protective gloves.
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 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.
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	: C <sub>12</sub> H <sub>8</sub>
Molecular weight	: 152.19 g/mol
CAS-No.	: 208-96-8
EC-No.	: 205-917-1

#### Hazardous components

Component	Classification	Concentration
<b>Acenaphthylene</b>		
	Acute Tox. 4; Skin Irrit. 2; Eye Irrit. 2A; STOT SE 3; H302, H315, H319, H335	<= 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

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.

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**

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**

Do not let product enter drains.

---

## **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: 78 - 82 °C (172 - 180 °F) - lit. |
| f) Initial boiling point and boiling range      | 280 °C (536 °F) - lit.                                |
| g) Flash point                                  | 122.0 °C (251.6 °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                             | 0.899 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

No data available

### 10.4 Conditions to avoid

No data available

### 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

LD50 Oral - Mouse - 1,760 mg/kg

Remarks: Autonomic Nervous System:Other (direct) parasympathomimetic. Respiratory disorder Blood: Hemorrhage.

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.

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.

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**

Inhalation - May cause respiratory irritation.

#### **Specific target organ toxicity - repeated exposure**

No data available

#### **Aspiration hazard**

No data available

#### **Additional Information**

RTECS: AB1254000

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**

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. (Acenaphthylene)

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**

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**

Acenaphthylene

CAS-No.  
208-96-8

Revision Date  
1993-04-24

**Pennsylvania Right To Know Components**

Acenaphthylene

CAS-No.  
208-96-8

Revision Date  
1993-04-24

**New Jersey Right To Know Components**

Acenaphthylene

CAS-No.  
208-96-8

Revision Date  
1993-04-24

**California Prop. 65 Components**

WARNING! This product contains a chemical known to the State of California to cause cancer.

Acenaphthylene

CAS-No.  
208-96-8

Revision Date  
2007-09-28

WARNING! This product contains a chemical known to the State of California to cause cancer.

Acenaphthylene

CAS-No.  
208-96-8

Revision Date  
2007-09-28

---

**16. OTHER INFORMATION**

**Full text of H-Statements referred to under sections 2 and 3.**

Acute Tox.	Acute toxicity
Eye Irrit.	Eye irritation
H302	Harmful if swallowed.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
Skin Irrit.	Skin irritation

**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**

Copyright 2016 Sigma-Aldrich Co. LLC. License granted to make unlimited paper copies for internal use only. 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](http://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: 01/23/2017

## SAFETY DATA SHEET

Creation Date 19-May-2010

Revision Date 07-Apr-2020

Revision Number 5

### 1. Identification

**Product Name** Acetophenone

**Cat No. :** A22-500

**CAS-No** 98-86-2

**Synonyms** Methyl Phenyl Ketone; 1-Phenylethanone; Hypnone (Certified)

**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 liquids	Category 4
Acute oral toxicity	Category 4
Serious Eye Damage/Eye Irritation	Category 2

**Label Elements**

**Signal Word**

Warning

**Hazard Statements**

Combustible liquid  
Harmful if swallowed  
Causes serious eye irritation

**Precautionary Statements****Prevention**

Wash face, hands and any exposed skin thoroughly after handling  
Do not eat, drink or smoke when using this product  
Keep away from heat/sparks/open flames/hot surfaces. - No smoking  
Wear protective gloves/protective clothing/eye protection/face protection

**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

**Fire**

In case of fire: Use CO<sub>2</sub>, dry chemical, or foam for extinction

**Storage**

Store in a well-ventilated place. Keep cool

**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 %
Acetophenone	98-86-2	>95

### 4. First-aid measures

<b>General Advice</b>	If symptoms persist, call a physician.
<b>Eye Contact</b>	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.
<b>Skin Contact</b>	Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.
<b>Inhalation</b>	Remove to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur.
<b>Ingestion</b>	Clean mouth with water and drink afterwards plenty of water.
<b>Most important symptoms and effects</b>	None reasonably foreseeable. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting
<b>Notes to Physician</b>	Treat symptomatically

### 5. Fire-fighting measures

<b>Suitable Extinguishing Media</b>	Water spray, carbon dioxide (CO <sub>2</sub> ), dry chemical, alcohol-resistant foam. Water mist may
-------------------------------------	--

be used to cool closed containers.

**Unsuitable Extinguishing Media** No information available

**Flash Point** 77 °C / 170.6 °F

**Method -** No information available

**Autoignition Temperature** 535 °C / 995 °F

**Explosion Limits**

**Upper** 6.7 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**

Combustible material. Containers may explode when heated. Keep product and empty container away from heat and sources of ignition. Risk of ignition.

**Hazardous Combustion Products**

Carbon monoxide (CO). Carbon dioxide (CO<sub>2</sub>).

**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**  
2

**Flammability**  
2

**Instability**  
0

**Physical hazards**  
N/A

## 6. Accidental release measures

**Personal Precautions** Use personal protective equipment as required. Ensure adequate ventilation. 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.

## 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.

**Storage** Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat, sparks and flame.

## 8. Exposure controls / personal protection

**Exposure Guidelines**

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Acetophenone	TWA: 10 ppm			TWA: 10 ppm

Legend

ACGIH - American Conference of Governmental Industrial Hygienists

**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**

<b>Eye/face Protection</b>	Tight sealing safety goggles. Face protection shield.
<b>Skin and body protection</b>	Wear appropriate protective gloves and clothing to prevent skin exposure.
<b>Respiratory Protection</b>	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.
<b>Hygiene Measures</b>	Handle in accordance with good industrial hygiene and safety practice.

**9. Physical and chemical properties**

<b>Physical State</b>	Liquid
<b>Appearance</b>	Light yellow
<b>Odor</b>	aromatic
<b>Odor Threshold</b>	No information available
<b>pH</b>	No information available
<b>Melting Point/Range</b>	19.6 °C / 67.3 °F
<b>Boiling Point/Range</b>	202 °C / 395.6 °F @ 760 mmHg
<b>Flash Point</b>	77 °C / 170.6 °F
<b>Evaporation Rate</b>	No information available
<b>Flammability (solid,gas)</b>	Not applicable
<b>Flammability or explosive limits</b>	
Upper	6.7 vol %
Lower	1.1 vol %
<b>Vapor Pressure</b>	1.3 mbar @ 20°C
<b>Vapor Density</b>	No information available
<b>Specific Gravity</b>	1.028
<b>Solubility</b>	Soluble in water
<b>Partition coefficient; n-octanol/water</b>	No data available
<b>Autoignition Temperature</b>	535 °C / 995 °F
<b>Decomposition Temperature</b>	No information available
<b>Viscosity</b>	1.8 mPa.s at 20 °C
<b>Molecular Formula</b>	C8 H8 O
<b>Molecular Weight</b>	120.15

**10. Stability and reactivity**

<b>Reactive Hazard</b>	None known, based on information available
<b>Stability</b>	Stable under normal conditions.
<b>Conditions to Avoid</b>	Incompatible products. Excess heat. Keep away from open flames, hot surfaces and sources of ignition.
<b>Incompatible Materials</b>	Strong oxidizing agents
<b>Hazardous Decomposition Products</b>	Carbon monoxide (CO), Carbon dioxide (CO <sub>2</sub> )
<b>Hazardous Polymerization</b>	Hazardous polymerization does not occur.
<b>Hazardous Reactions</b>	None under normal processing.

**11. Toxicological information****Acute Toxicity****Product Information**

**Component Information**

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Acetophenone	900 mg/kg ( Rat ) 815 mg/kg ( Rat )	3300 mg/kg ( Rat )	LC50 > 2.130 mg/L ( Rat ) 8 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
Acetophenone	98-86-2	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** 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.

## 12. Ecological information

**Ecotoxicity**

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Acetophenone	Not listed	Brachydanio rerio: LC50 = 155 mg/L 96h	EC50 = 15.5 mg/L 15 min	EC50 = 162 mg/L 48h

**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
Acetophenone	1.7

## 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
Acetophenone - 98-86-2	U004	-

## 14. Transport information

<u>DOT</u>	Not regulated
<u>TDG</u>	Not regulated
<u>IATA</u>	Not regulated
<u>IMDG/IMO</u>	Not regulated

## 15. Regulatory information

### United States of America Inventory

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
Acetophenone	98-86-2	X	ACTIVE	TP

#### Legend:

**TSCA** - Toxic Substances Control Act, (40 CFR Part 710)

X - Listed

'-' - Not Listed

TP - Indicates a substance that is the subject of a proposed TSCA Section 4 test rule

**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 (ECL), China (IECSC), Japan (ENCS), Philippines (PICCS).

Component	CAS-No	DSL	NDSL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
Acetophenone	98-86-2	X	-	202-708-7	X	X	X	X	KE-28355

### U.S. Federal Regulations

#### SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Acetophenone	98-86-2	>95	1.0

**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
Acetophenone	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
Acetophenone	5000 lb	-

**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
Acetophenone	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** Moderate risk, Grade 2

**16. Other information**

**Prepared By** Regulatory Affairs  
Thermo Fisher Scientific  
Email: EMSDS.RA@thermofisher.com

**Creation Date** 19-May-2010  
**Revision Date** 07-Apr-2020  
**Print Date** 07-Apr-2020  
**Revision Summary** SDS sections updated. 16.

**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 – Benzene

Revision Nr: 3  
Issue date: 15/12/2014  
Supersedes: 12/08/2011

## SECTION 1: Identification of the substance/mixture and of the company/undertaking

### 1.1. Product identifier

Chemical name : benzene  
EC Index : 601-020-00-8  
EC No : 200-753-7  
CAS No. : 71-43-2  
REACH registration No. : 01-2119447106-44  
Formula : C<sub>6</sub>H<sub>6</sub>

### 1.2. Relevant identified uses of the substance or mixture and uses advised against

Specific use(s) : Use as an intermediate  
The substance/product is registered with strictly controlled conditions as defined in Article 18(4) of Regulation (EC) No. 1907/2006 (REACH Regulation) and must therefore be handled as such.

### 1.3. Details of the supplier of the safety data sheet

Company : Transcor Energy  
Parc de L'Alliance, Boulevard de France 7  
1420 Braine-L'Alleud, Belgium  
Telephone +32 2 663 19 00  
Telefax: +32 2 675 49 99  
E-mail: reach@transcor.be

### 1.4. Emergency telephone number

Emergency telephone : +32 3 575 03 30 (This telephone number is available 24 hours per day, 7 days per week.)

IRELAND (REPUBLIC OF)  
National Poisons Information Centre  
Beaumont Hospital +353 18 37 99 64/+353 1 809 21 66  
UNITED KINGDOM  
National Poisons Information Service  
(Newcastle Centre) 0844 892 0111 (UK only, Monday to Friday, 08.00 to 18.00 hours)  
Regional Drugs and Therapeutics Centre,  
Wolfson Unit

## SECTION 2: Hazards identification

### 2.1. Classification of the substance or mixture

#### 2.1.1. Classification according to Regulation (EU) 1272/2008

CLP-Classification : The product is classified as hazardous in accordance with Regulation (EC) No. 1272/2008.

Flam. Liq. 2 H225  
Skin Irrit. 2 H315  
Eye Irrit. 2 H319  
Muta. 1B H340  
Carc. 1A H350  
STOT RE 1 H372  
Asp. Tox. 1 H304

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Full text of H-phrases: see section 16

## 2.1.2. Classification according to EU Directives 67/548/EEC or 1999/45/EC

Classification : This substance is classified as hazardous according to 67/548/EEC.  
 F; R11  
 Xn; R65  
 T; R48/23/24/25  
 Xi; R36/38  
 Carc.Cat.1; R45  
 Muta.Cat.2; R46

Full text of R-phrases: see section 16

## 2.2. Label elements

### 2.2.1. Labelling according to Regulation (EU) 1272/2008

Hazard pictograms :



GHS02

GHS07

GHS08

Signal word :

Danger

Hazard statements :

H225 - Highly flammable liquid and vapour.  
 H304 - May be fatal if swallowed and enters airways.  
 H315 - Causes skin irritation.  
 H319 - Causes serious eye irritation.  
 H340 - May cause genetic defects.  
 H350 - May cause cancer.  
 H372 - Causes damage to organs through prolonged or repeated exposure.  
 P202 - Do not handle until all safety precautions have been read and understood.  
 P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.  
 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/doctor/.  
 P303+P361+P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.  
 P331 - Do NOT induce vomiting.

### 2.2.2. Labelling according to Directives (67/548 - 1999/45)

Not relevant

## 2.3. Other hazards

Other hazards : Vapours can form explosive mixtures with air.  
 Results of PBT and vPvB assessment :  
 Not applicable

## SECTION 3: Composition/information on ingredients

### 3.1. Substances

## Safety Data Sheet – Benzene

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Substance name	Product identifier	%	Classification according to Directive 67/548/EEC
Benzene	(CAS No.) 71-43-2 (EC No) 200-753-7 (EC Index) 601-020-00-8 (REACH-no) 01-2119447106-44-0099	100	F; R11 Xn; R65 T; R48/23/24/25 Xi; R36/38 Carc. Cat. 1; R45 Muta. Cat. 2; R46

Substance name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Benzene	(CAS No.) 71-43-2 (EC No) 200-753-7 (EC Index) 601-020-00-8 (REACH-no) 01-2119447106-44-0099	100	Flam. Liq. 2, H225 Skin Irrit. 2, H315 Eye Irrit. 2, H319 Muta. 1B, H340 Carc. 1A, H350 STOT RE 1, H372 Asp. Tox. 1, H304

Full text of R- and H-phrases: see section 16

### 3.2. Mixtures

Not applicable

## SECTION 4: First aid measures

### 4.1. Description of first aid measures

- |                      |  |
|----------------------|--|
| Inhalation           | : Remove person to fresh air and keep comfortable for breathing.<br>When in doubt or if symptoms are observed, get medical advice.<br>If breathing is irregular or stopped, administer artificial respiration.<br>Get medical advice/attention.  |
| Skin contact         | : Take off contaminated clothing.<br>Gently wash with plenty of soap and water.<br>Get medical advice/attention.   |
| Eye contact          | : Rinse immediately carefully and thoroughly with eye-bath or water.<br>Remove contact lenses, if present and easy to do. Continue rinsing.<br>Get immediate medical advice/attention.   |
| In case of ingestion | : Rinse mouth thoroughly with water.<br>Do NOT induce vomiting.<br>Get immediate medical advice/attention.   |
| Additional advice    | : First aider: Pay attention to self-protection!<br>Personal protection equipment: see section 8<br>Never give anything by mouth to an unconscious person or a person with cramps.<br>When in doubt or if symptoms are observed, get medical advice.<br>Show this safety data sheet to the doctor in attendance.<br>Treat symptomatically. |

### 4.2. Most important symptoms and effects, both acute and delayed

- |            |   |
|------------|---|
| Inhalation | : Causes damage to organs through prolonged or repeated exposure. The following symptoms may occur: Dizziness Drowsiness Unconsciousness Headache Nausea Convulsions Shortness of breath. |
|------------|---|

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- |                       |  |
|-----------------------|--|
| Skin contact          | : Causes skin irritation. Causes damage to organs through prolonged or repeated exposure. The following symptoms may occur: Dry skin Pain erythema (redness).  |
| Eye contact           | : Causes serious eye irritation. The following symptoms may occur: Redness, pain.  |
| Ingestion             | : May be fatal if swallowed and enters airways. Causes damage to organs through prolonged or repeated exposure. The following symptoms may occur: Abdominal pain Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhoea. Sore throat. |
| Other adverse effects | : Causes damage to organs through prolonged or repeated exposure. May cause cancer. May cause genetic defects.   |

## **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 spray, alcohol resistant foam, Dry extinguishing powder, Carbon dioxide |
| Extinguishing media which must not be used for safety reasons | : Strong water jet  |

### **5.2. Special hazards arising from the substance or mixture**

- |                  |  |
|------------------|--|
| Fire hazard      | : Highly flammable liquid and vapour.  |
| Specific hazards | : Heating causes rise in pressure with risk of bursting.<br>Vapours can form explosive mixtures with air.<br>Vapours are heavier than air, spread along floors and form explosive mixtures with air.<br>Vapours can travel considerable distances to a source of ignition where they can ignite, flash back, or explode.<br>Hazardous combustion products:<br>Carbon oxides<br>Nitrogen oxides (NOx)<br>Volatile organic compounds |

### **5.3. Advice for firefighters**

- |                         |  |
|-------------------------|--|
| Advice for firefighters | : Special protective equipment for firefighters.<br>In case of fire: Wear self-contained breathing apparatus.<br>Use water spray jet to protect personnel and to cool endangered containers.<br>Do not allow run-off from fire-fighting to enter drains or water courses.<br>Dispose according to legislation.<br>Evacuate area. |
|-------------------------|--|

## **SECTION 6: Accidental release measures**

### **6.1. Personal precautions, protective equipment and emergency procedures**

- |                             |  |
|-----------------------------|--|
| For non-emergency personnel | : Evacuate area.<br>Stay upwind/keep distance from source.<br>Provide adequate ventilation.<br>Use personal protective equipment as required.<br>Personal protection equipment: see section 8<br>Do not breathe vapour/spray.<br>Avoid contact with skin, eyes and clothes.<br>Keep away from heat, hot surfaces, sparks, open flames and other ignition |
|-----------------------------|--|

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For emergency responders : sources. No smoking.  
Ensure that the equipment is adequately grounded.  
Use explosion-proof machinery, apparatus, ventilation facilities, tools etc.  
Use only non-sparking tools.  
: Ensure procedures and training for emergency decontamination and disposal are in place.  
Personal protection equipment: see section 8.

## 6.2. Environmental precautions

Environmental precautions : Do not allow to enter into ground-water, surface water or drains.  
If the product contaminates rivers and lakes or drains inform respective authorities.

## 6.3. Methods and material for containment and cleaning up

Methods for cleaning up : Use foam on spills to minimise vapours.  
Stop leak if safe to do so.  
Dam up.  
Clean-up methods - small spillage: Absorb with liquid-binding material (e.g. sand, diatomaceous earth, acid- or universal binding agents)., Collect in closed and suitable containers for disposal.  
Absorb with liquid-binding material (e.g. sand, diatomaceous earth, acid- or universal binding agents).  
Sweep or shovel spills into appropriate container for disposal  
Clean-up methods - large spillage: Large spills should be collected mechanically (remove by pumping) for disposal., Collect in closed and suitable containers for disposal.  
Large spills should be collected mechanically (remove by pumping) for disposal.  
Use only explosion-proof equipment.  
Dispose of waste product or used containers according to local regulations.

## 6.4. Reference to other sections

Personal protection equipment: see section 8  
Disposal: see section 13.

# SECTION 7: Handling and storage

## 7.1. Precautions for safe handling

Handling : Provide adequate ventilation.  
Use personal protective equipment as required.  
Personal protection equipment: see section 8  
Do not breathe vapour/spray.  
Avoid contact with skin, eyes and clothes.  
Take any precaution to avoid mixing with incompatible materials.  
See also section 10  
Ensure proper process control to avoid excess waste discharge (temperature, concentration, pH value, time).  
Do not allow contact with soil, surface or ground water.  
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.  
Ensure that the equipment is adequately grounded.  
Use explosion-proof machinery, apparatus, ventilation facilities, tools etc.  
Use only non-sparking tools.

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The substance/product is registered with strictly controlled conditions as defined in Article 18(4) of Regulation (EC) No. 1907/2006 (REACH Regulation) and must therefore be handled as such.

Advices on general occupational hygiene : Keep good industrial hygiene.  
Wash hands before breaks and immediately after using the product.  
When using do not eat, drink or smoke.  
Keep away from food, drink and animal feedingstuffs.  
Keep work clothes separately.  
Take off contaminated clothing.  
Wash contaminated clothing before reuse.

## 7.2. Conditions for safe storage, including any incompatibilities

Storage : Keep in a dry, cool and well-ventilated place.  
Do not store near or with any of the incompatible materials listed in section 10.  
Bund storage facilities to prevent soil and water pollution in the event of spillage.  
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

Packaging materials : Keep/Store only in original container.

## 7.3 Specific end use(s)

Intermediate.

## SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters

Exposure limit values :

Benzene (71-43-2)		
Belgium	Limit value (mg/m <sup>3</sup> )	3,25 mg/m <sup>3</sup>
Belgium	Limit value (ppm)	1 ppm
Bulgaria	OEL TWA (mg/m <sup>3</sup> )	3,25 mg/m <sup>3</sup>
Croatia	GVI (granična vrijednost izloženosti) (mg/m <sup>3</sup> )	3,25 mg/m <sup>3</sup>
Croatia	GVI (granična vrijednost izloženosti) (ppm)	1 ppm
Cyprus	OEL TWA (mg/m <sup>3</sup> )	3,25 mg/m <sup>3</sup>
Cyprus	OEL TWA (ppm)	1 ppm
France	VME (mg/m <sup>3</sup> )	3,25 mg/m <sup>3</sup> (restrictive limit)
France	VME (ppm)	1 ppm (restrictive limit)
Greece	OEL TWA (mg/m <sup>3</sup> )	3,19 mg/m <sup>3</sup>
Greece	OEL TWA (ppm)	1,0 ppm
Italy - Portugal - USA ACGIH	ACGIH TWA (ppm)	0,5 ppm
Italy - Portugal - USA ACGIH	ACGIH STEL (ppm)	2,5 ppm
Italy	OEL TWA (mg/m <sup>3</sup> )	3,25 mg/m <sup>3</sup>
Italy	OEL TWA (ppm)	1 ppm
Latvia	OEL TWA (mg/m <sup>3</sup> )	3,25 mg/m <sup>3</sup>
Latvia	OEL TWA (ppm)	1 ppm
Spain	VLA-ED (mg/m <sup>3</sup> )	3,25 mg/m <sup>3</sup> (manufacturing, commercialization, and use restrictions under REACH; worker protection to carcinogens in the workplace)

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Spain	VLA-ED (ppm)	1 ppm (manufacturing, commercialization, and use restrictions under REACH; worker protection to exposure to carcinogens and mutagens in the workplace)
Switzerland	VME (mg/m <sup>3</sup> )	1,6 mg/m <sup>3</sup>
Switzerland	VME (ppm)	0,5 ppm
Netherlands	Grenswaarde TGG 8H (mg/m <sup>3</sup> )	3,25 mg/m <sup>3</sup>
United Kingdom	WEL TWA (mg/m <sup>3</sup> )	3,25 mg/m <sup>3</sup>
United Kingdom	WEL TWA (ppm)	1 ppm
United Kingdom	WEL STEL (mg/m <sup>3</sup> )	9,75 mg/m <sup>3</sup> (calculated)
United Kingdom	WEL STEL (ppm)	3 ppm (calculated)
Czech Republic	Expoziční limity (PEL) (mg/m <sup>3</sup> )	3 mg/m <sup>3</sup>
Denmark	Grænseværdie (langvarig) (mg/m <sup>3</sup> )	1,6 mg/m <sup>3</sup>
Denmark	Grænseværdie (langvarig) (ppm)	0,5 ppm
Finland	HTP-arvo (8h) (mg/m <sup>3</sup> )	3,25 mg/m <sup>3</sup>
Finland	HTP-arvo (8h) (ppm)	1 ppm
Hungary	MK-érték	3 mg/m <sup>3</sup>
Ireland	OEL (8 hours ref) (mg/m <sup>3</sup> )	3 mg/m <sup>3</sup>
Ireland	OEL (8 hours ref) (ppm)	1 ppm
Ireland	OEL (15 min ref) (mg/m <sup>3</sup> )	9 mg/m <sup>3</sup> (calculated)
Ireland	OEL (15 min ref) (ppm)	3 ppm (calculated)
Lithuania	IPRV (mg/m <sup>3</sup> )	3,25 mg/m <sup>3</sup>
Lithuania	IPRV (ppm)	1 ppm
Lithuania	TPRV (mg/m <sup>3</sup> )	19 mg/m <sup>3</sup>
Lithuania	TPRV (ppm)	6 ppm
Norway	Gjennomsnittsverdier (AN) (mg/m <sup>3</sup> )	3 mg/m <sup>3</sup>
Norway	Gjennomsnittsverdier (AN) (ppm)	1 ppm
Norway	Gjennomsnittsverdier (Kortidsverdi) (mg/m <sup>3</sup> )	6 mg/m <sup>3</sup>
Norway	Gjennomsnittsverdier (Kortidsverdi) (ppm)	3 ppm
Poland	NDS (mg/m <sup>3</sup> )	1,6 mg/m <sup>3</sup>
Romania	OEL TWA (mg/m <sup>3</sup> )	3,25 mg/m <sup>3</sup>
Romania	OEL TWA (ppm)	1 ppm
Sweden	nivågränsvärde (NVG) (mg/m <sup>3</sup> )	1,5 mg/m <sup>3</sup>
Sweden	nivågränsvärde (NVG) (ppm)	0,5 ppm
Sweden	kortidsvärde (KTV) (mg/m <sup>3</sup> )	9 mg/m <sup>3</sup>
Sweden	kortidsvärde (KTV) (ppm)	3 ppm

Recommended monitoring procedures : Personal air monitoring  
 Room air monitoring

### 8.2. Exposure controls

Personal protection equipment : The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection : In case of insufficient ventilation, wear suitable respiratory equipment.  
 Half-face mask (EN 140)  
 Full face mask (EN 136)  
 Filter type: AP (EN 141)  
 The filter class must be suitable for the maximum contaminant

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	concentration (gas/vapour/aerosol/particulates) that may arise when handling the product. If the concentration is exceeded, self-contained breathing apparatus must be used. (EN 137)
Hand protection	: Wear chemically resistant gloves (tested to EN374) ,Suitable material:;NBR (Nitrile rubber) (> 0.45 mm, BTT > 30 min.),PVA (Polyvinyl alcohol) (BTT > 480 min.),Fluoropolymers (BTT > 480 min.),The quality of the protective gloves resistant to chemicals must be chosen as a function of the specific working place concentration and quantity of hazardous substances.
Eye protection	: Use suitable eye protection. (EN166): Goggles
Body protection	: Wear suitable protective clothing. Wear suitable coveralls to prevent exposure to the skin. Chemical resistant safety shoes
Thermal hazard protection	: Not required under normal use. Use dedicated equipment.
Engineering control measures	: The substance/product is registered with strictly controlled conditions as defined in Article 18(4) of Regulation (EC) No. 1907/2006 (REACH Regulation) and must therefore be handled as such. Provide adequate ventilation. Organisational measures to prevent /limit releases, dispersion and exposure Safe handling: see section 7 . Transfer and handle product only in closed systems. Guarantee that the eye flushing systems and safety showers are closely located to the working place. Store locked up. Take precautionary measures against static discharges. Ensure that the equipment is adequately grounded. Use explosion-proof machinery, apparatus, ventilation facilities, tools etc.
Environmental exposure controls	: Do not allow contact with soil, surface or ground water. Comply with applicable Community environmental protection legislation.

### SECTION 9: Physical and chemical properties

#### 9.1. Information on basic physical and chemical properties

Appearance	: liquid
Colour	: clear
Odour	: characteristic
Odour threshold	: No data available
pH	: No data available
Melting point/freezing point	: 5,49 °C
Initial boiling point and boiling range	: 80,09 °C
Flash point	: 11 °C
Evaporation rate	: No data available
Flammability (solid, gas)	: Not applicable, liquid
Upper/lower flammability or explosive limits	: < No data available
Vapour pressure	: 10 kPa (20 °C) 100 kPa (79.9 °C)
Vapour density	: No data available



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Density	: 0,8765 g/cm <sup>3</sup> (20 °C)
Relative density	: No data available
Water solubility	: ≈ 1,88 g/l (23.5 °C)
Solubility in different media	: Justification for data waiving not relevant
Partition coefficient n-octanol/water	: 2,13
Auto-ignition temperature	: 498 °C
Decomposition temperature	: No data available
Viscosity	: 0,604 mPa.s (25 °C)
Explosive properties	: Not applicable The study does not need to be conducted because there are no chemical groups associated with explosive properties present in the molecule.
Oxidising properties	: Not applicable The classification procedure needs not to be applied because there are no chemical groups present in the molecule which are associated with oxidising properties.

## 9.2. Other information

Surface tension	: Justification for data waiving not relevant
-----------------	---

## SECTION 10: Stability and reactivity

### 10.1. Reactivity

Reactivity	: Highly flammable liquid and vapour. Reference to other sections: 10.4 & 10.5
------------	---

### 10.2. Chemical stability

Stability	: The product is stable under storage at normal ambient temperatures.
-----------	---

### 10.3. Possibility of hazardous reactions

Possibility of hazardous reactions	: Vapours can form explosive mixtures with air.
------------------------------------	---

### 10.4. Conditions to avoid

Conditions to avoid	: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Safe handling: see section 7
---------------------	--

### 10.5. Incompatible materials

Incompatible materials	: Oxidising substances, Strong acids, Halogens, Safe handling: see section 7
------------------------	--

### 10.6. Hazardous decomposition products

Hazardous decomposition products	: Reference to other sections: 5.2
----------------------------------	------------------------------------

## SECTION 11: Toxicological information

### 11.1. Information on toxicological effects

Acute toxicity	: Not classified (Based on available data, the classification criteria are not met.)
----------------	--

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<b>Benzene (71-43-2)</b>	
LD50/oral/rat	> 2000 mg/kg
LD50/dermal/rabbit	> 5000 mg/kg
ATE CLP (vapours)	44,5 mg/l/4h

Skin corrosion/irritation	: Causes skin irritation. pH: No data available
Serious eye damage/eye irritation	: Causes serious eye irritation. pH: No data available
Respiratory or skin sensitisation	: Not classified (Based on available data, the classification criteria are not met.)
Germ cell mutagenicity	: May cause genetic defects.
Carcinogenicity	: May cause cancer. LOAEL, Oral, Rat: 25 mg/kg bw/day
Reproductive toxicity	: Not classified (Based on available data, the classification criteria are not met.) NOAEC, Inhalation: 960 mg/m <sup>3</sup> NOAEC, Developmental toxicity, Inhalation, Rat: 32 mg/m <sup>3</sup>
STOT-single exposure	: Not classified (Based on available data, the classification criteria are not met.)
STOT-repeated exposure	: Causes damage to organs through prolonged or repeated exposure.
Aspiration hazard	: May be fatal if swallowed and enters airways.

### Other information

Reference to other sections: 4.2, Symptoms related to the physical, chemical and toxicological characteristics, For further information see section 4

## SECTION 12: Ecological information

### 12.1. Toxicity

<b>Benzene (71-43-2)</b>	
LC50 fish 1	eco mg/l (96 h)
EC50 Daphnia 1	10 mg/l (48h)
ErC50 (algae)	100 mg/l (72 h)
LOEC (chronic)	1,6 mg/l
NOEC (chronic)	3 mg/l Invertebrates.
NOEC chronic fish	0,8 mg/l
NOEC chronic crustacea	3 mg/l
NOEC chronic algae	≈
Additional information	ErC10, Biomass, 72h, algae: 10 mg/l ErC10, Growth rate, 72h, algae: 34 mg/l IC50, 24h, micro-organisms: 13 mg/l

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## **12.2. Persistence and degradability**

Persistence and degradability : Readily biodegradable.

## **12.3. Bioaccumulative potential**

Bioaccumulation : Low potential  
 Partition coefficient n-octanol/water : 2,13  
 Bioconcentration factor (BCF) : < 10

## **12.4. Mobility in soil**

Mobility :  
 Surface tension : Justification for data waiving

## **12.5. Results of PBT and vPvB assessment**

PBT/vPvB data :

## **12.6. Other adverse effects**

Other information :

## **SECTION 13: Disposal considerations**

### **13.1. Waste treatment methods**

Product waste: : Do not allow contact with soil, surface or ground water.  
 Dispose of empty containers and wastes safely.  
 Safe handling: see section 7  
 Refer to manufacturer/supplier for information on recovery/recycling  
 Recycling is preferred to disposal or incineration  
 If recycling is not possible, eliminate in accordance with local valid waste disposal regulations  
  
 Contaminated packaging : Never use pressure to empty container.  
 Do not pierce or burn, even after use.  
 Handle contaminated packages in the same way as the substance itself.  
 Dispose according to legislation.  
  
 List of proposed waste codes/waste designations in accordance with EWC : This material and its container must be disposed of as hazardous waste.  
 Waste codes should be assigned by the user based on the application for which the product was used.

## **SECTION 14: Transport information**

### **14.1. UN number**

UN number : 1114

### **14.2. UN proper shipping name**

Proper Shipping Name : BENZENE  
 Proper Shipping Name (IATA) : BENZENE  
 Proper Shipping Name (IMDG) : BENZENE  
 Proper Shipping Name (ADN) : BENZENE

### **14.3. Transport hazard class(es)**

#### **14.3.1. Overland transport**

Class(es) : 3 - Flammable liquid  
 Hazard identification number (Kemler No.) : 33  
 Classification code : F1

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ADR/RID-Labels : 3 - Flammable liquid



## 14.3.2. Inland waterway transport (ADN)

Class (UN) : 3

## 14.3.3. Transport by sea

Class or Division : 3 - flammable liquids

## 14.3.4. Air transport

Class or Division : 3 - flammable liquids

## 14.4. Packing group

Packing group : II

## 14.5. Environmental hazards

Other information : No supplementary information available.

## 14.6. Special precautions for user

Special precautions for user : No data available.

## 14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

No data available

## SECTION 15: Regulatory information

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

#### 15.1.1. EU-Regulations

The following restrictions are applicable according to Annex XVII of the REACH Regulation (EC) No 1907/2006 :

3. Liquid substances or mixtures which are regarded as dangerous in accordance with Directive 1999/45/EC or are fulfilling the criteria for any of the following hazard classes or categories set out in Annex I to Regulation (EC) No 1272/2008 : Benzene

5. Benzene : Benzene

28. Substances which appear in Part 3 of Annex VI to Regulation (EC) No 1272/2008 classified as Carcinogen category 1A or 1B (Table 3.1) or Carcinogen category 1 or 2 (Table 3.2) and listed as follows: Carcinogen category 1A (Table 3.1)/Carcinogen category 1 (Table 3.2) listed in Appendix 1 Carcinogen category 1B (Table 3.1)/Carcinogen category 2 (Table 3.2) listed in Appendix 2 : Benzene

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29. Substances which appear in Part 3 of Annex VI to Regulation (EC) No 1272/2008 classified as Germ cell Mutagen category 1A or 1B (Table 3.1) or Mutagen category 1 or 2 (Table 3.2) and listed as follows: Mutagen category 1A (Table 3.1)/Mutagen category 1 (Table 3.2) listed in Appendix 3 Mutagen category 1B (Table 3.1)/Mutagen category 2 (Table 3.2) listed in Appendix 4 : Benzene

40. Substances classified as flammable gases category 1 or 2, flammable liquids categories 1, 2 or 3, flammable solids category 1 or 2, substances and mixtures which, in contact with water, emit flammable gases, category 1, 2 or 3, pyrophoric liquids category 1 or pyrophoric solids category 1, regardless of whether they appear in Part 3 of Annex VI to Regulation (EC) No 1272/2008 or not. : Benzene

This product contains an ingredient according to the candidate list of Annex XIV of the REACH Regulation 1907/2006/EC. : none  
 Authorisations : Not applicable

## 15.1.2. National regulations

DE : WGK : 3  
 NL : ABM : 2 - May cause heritable genetic damage., 3 - May cause cancer.  
 NL : NeR (Nederlandse emissie Richtlijn) : Organic substances in vapour or gaseous form

## 15.2. Chemical safety assessment

Chemical Safety Assessment : For this substance a chemical safety assessment has been carried out.

## SECTION 16: Other information

Full text of R-, H- and EUH-phrases:

Asp. Tox. 1	: Aspiration hazard, Category 1
Carc. 1A	: Carcinogenicity, Category 1A
Eye Irrit. 2	: Serious eye damage/eye irritation Category 2
Flam. Liq. 2	: Flammable liquids, Category 2
Muta. 1B	: Germ cell mutagenicity, hazard categories 1B
Skin Irrit. 2	: Skin corrosion/irritation, Category 2
STOT RE 1	: Specific target organ toxicity — Repeated exposure, Category 1
H225	: Highly flammable liquid and vapour.
H304	: May be fatal if swallowed and enters airways.
H315	: Causes skin irritation.
H319	: Causes serious eye irritation.
H340	: May cause genetic defects.
H350	: May cause cancer.
H372	: Causes damage to organs through prolonged or repeated exposure.
R11	: Highly flammable.
R36/38	: Irritating to eyes and skin.
R45	: May cause cancer.
R46	: May cause heritable genetic damage.
R48/23/24/25	: Toxic: danger of serious damage to health by prolonged exposure through inhalation,

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in contact with skin and if swallowed.  
 R65 : Harmful: may cause lung damage if swallowed.  
 F : Highly flammable  
 T : Toxic  
 Xi : Irritant  
 Xn : Harmful

Key literature references and sources : CSR  
for data

Safety datasheet sections which have : 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16  
been updated

Abbreviations and acronyms : ABM = Algemene beoordelingsmethodiek  
 ADN = Accord Européen relatif au Transport International des Marchandises  
 Dangereuses par voie de Navigation du Rhin  
 ADR = Accord européen relatif au transport international des marchandises  
 Dangereuses par Route  
 CLP = Classification, Labelling and Packaging Regulation according to 1272/2008/EC  
 IATA = International Air Transport Association  
 IMDG = International Maritime Dangerous Goods Code  
 LEL = Lower Explosive Limit/Lower Explosion Limit  
 UEL = Upper Explosion Limit/Upper Explosive Limit  
 REACH = Registration, Evaluation, Authorisation and Restriction of Chemicals  
 BTT = Breakthrough time (maximum wearing time)  
 DMEL = Derived minimal effect level  
 DNEL = Derived No Effect Level  
 EC50 = Median Effective Concentration  
 EL50 = Median effective level  
 ErC50 = EC50 in terms of reduction of growth rate  
 ErL50 = EL50 in terms of reduction of growth rate  
 EWC = European Waste Catalogue  
 LC50 = Median lethal concentration  
 LD50 = Median lethal dose  
 LL50 = Median lethal level  
 NA = Not applicable  
 NOEC = No observed effect concentration  
 NOEL: no-observed-effect level  
 NOELR = No observed effect loading rate  
 NOAEC = No observed adverse effect concentration  
 NOAEL = No observed adverse effect level  
 N.O.S. = Not Otherwise Specified  
 OEL = Occupational Exposure Limits - Short Term Exposure Limits (STELs)  
 PNEC = Predicted No Effect Concentration  
 Quantitative structure-activity relationship (QSAR)  
 STOT = Specific Target Organ Toxicity  
 TWA = time weighted average  
 VOC = Volatile organic compounds  
 WGK = Wassergefährdungsklasse (Water Hazard Class under German Federal Water  
 Management Act)

The contents and format of this SDS are in accordance with EEC Commission Directive 1999/45/EC, 67/548/EC, 1272/2008/EC and EEC Commission Regulation 1907/2006/EC (REACH) Annex II.

**DISCLAIMER OF LIABILITY** The information in this SDS was obtained from sources which we believe are reliable. However, the information is provided without any warranty, express or implied, regarding its correctness. The conditions or methods of

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handling, storage, use or disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product. This SDS was prepared and is to be used only for this product. If the product is used as a component in another product, this SDS information may not be applicable.

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## 1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

### 1.1 Product Identifier

**Chemical Name** Benzo[k]fluoranthene

**Catalogue #** B203560

### 1.2 Relevant Identified Uses of the Substance or Mixture and Uses Advised Against

**Product Uses** To be used only for scientific research and development. Not for use in humans or animals.

### 1.3 Details of the Supplier of the Safety Data Sheet

**Company** Toronto Research Chemicals  
2 Brisbane Road  
Toronto, ON M3J 2J8  
CANADA

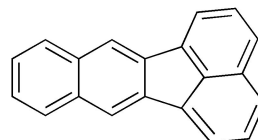
**Telephone** +14166659696

**FAX** +14166654439

**Email** orders@trc-canada.com

### 1.4 Emergency Telephone Number

**Emergency#** +1(416) 665-9696 between 0800-1700 (GMT-5)



## 2. HAZARDS IDENTIFICATION

### WHMIS Classification (Canada)

D2A Very Toxic Material Causing Other Toxic Effects  
Carcinogen

### WHMIS Symbols (Canada)



### 2.1/2.2 Classification of the Substance or Mixture and Label Elements

#### GHS Hazards Classification (According to EU Regulation 1272/2008 and US OSHA 1910.1200)

Carcinogenicity (Category 1B)

Hazardous to the Aquatic Environment, Acute Hazard (Category 1)

Hazardous to the Aquatic Environment, Long-Term Hazard (Category 1)

#### GHS Hazards Identification (According to EU Regulation 1272/2008 and US OSHA 1910.1200)

**Signal Word** Danger



#### GHS Hazard Statements

H350 May cause cancer.

H400 Very toxic to aquatic life.

H410 Very toxic to aquatic life with long lasting effects.

#### GHS Precautionary Statements

P201 Obtain special instructions before use.

P273 Avoid release to the environment.



## **2.3 Unclassified Hazards/Hazards Not Otherwise Classified**

No data available.

## **3. COMPOSITION/INFORMATION ON INGREDIENTS**

### **3.1 Substances**

**Molecular Formula:** C<sub>20</sub>H<sub>12</sub>

**Molecular Weight:** 252.31

**CAS Registry #:** 207-08-9

**EC#:** 205-916-6

#### **Synonyms**

11,12-Benzofluoranthene; 2,3,1',8'-Binaphthylene; 8,9-Benzfluoranthene; 8,9-Benzofluoranthene; Dibenzo[b,jk]fluorene

### **3.2 Mixtures**

Not a mixture.

## **4. FIRST AID MEASURES**

### **4.1 Description of First Aid Measures**

#### **General Advice**

If medical attention is required, show this safety data sheet to the doctor.

#### **If Inhaled**

If inhaled, move person to fresh air. If not breathing, give artificial respiration and consult a physician.

#### **In Case of Skin Contact**

Wash affected area with soap and water. Consult a physician if any exposure symptoms are observed.

#### **In Case of Eye Contact**

Immediately rinse eyes with plenty of water for at least 15 minutes. Consult a physician.

#### **If Swallowed**

Never give anything by mouth to an unconscious person. Rinse mouth with water. Do NOT induce vomiting unless advised to do so by a physician or Poison Control Center. Seek medical attention.

### **4.2 Most Important Symptoms and Effects, Both Acute and Delayed**

The most important known symptoms and effects are described in the labeling (see section 2.2) and/or section 11.

### **4.3 Indication of any Immediate Medical Attention and Special Treatment Needed**

No data available.

## **5. FIREFIGHTING MEASURES**

### **5.1 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 fire fighting if necessary.

### **5.4 Further Information**

No data available.

## **6. ACCIDENTAL RELEASE MEASURES**

#### **Personal precautions**

Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

#### **Environmental precautions**

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

**Method 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.

**7. HANDLING AND STORAGE****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.

**Conditions for safe storage**

Keep container tightly closed in a dry and well-ventilated place.  
Keep in a dry place.

Storage conditions: Refrigerator

**7.3 Specific End Uses**

For scientific research and development only. Not for use in humans or animals.

**8. EXPOSURE CONTROLS/PERSONAL PROTECTION****8.1 Control Parameters**

Contains no components with established occupational exposure limits.

**8.2 Exposure Controls****Appropriate Engineering Controls**

A laboratory fumehood or other appropriate form of local exhaust ventilation should be used to avoid exposure.

**Personal Protective Equipment**

All recommendations below are advisory in nature and a risk assessment should be performed by the employer/end user prior to use of this product. The type of protective equipment must be selected based on the amount and concentration of the dangerous material being used in the workplace.

**Eye/Face Protection**

Safety goggles or face shield. All equipment should have been tested and approved under appropriate standards, such as NIOSH (US), CSA (Canada), or EN 166 (EU).

**Skin Protection**

Gloves should be used when handling this material. Gloves are to be inspected prior to use. Contaminated gloves are to be removed using proper glove removal technique so that the outer surface of the glove does not contact bare skin. Dispose of contaminated gloves after use in compliance with good laboratory practices and local requirements.

Gloves used for incidental exposures (splash protection) should be designated as "chemical resistant" by EU standard EN 374 with the resistance codes corresponding to the anticipated use of the material. Unrated gloves are not recommended.

Suggested gloves: AnsellPro Sol-Vex nitrile gloves style 37-175, 15 mil thickness.

Penetration time has not been determined.

Gloves used for prolonged direct exposure (immersion) should be designated "chemical resistant" as per EN 734 with the resistance codes corresponding to the anticipated use of the material.

Suggested gloves: AnsellPro Viton/Butyl gloves style 38-612, 4/8 mil thickness.

Penetration time has not been determined.

These recommendations may not apply if the material is mixed with any other chemical, or dissolved into a solution. A risk assessment must be performed to ensure the gloves will still offer acceptable protection.

**Body Protection**

Fire resistant (Nomex) coveralls or chemical-resistant bodysuit (laminated Tychem SL or equivalent).

**Respiratory Protection**

Recommended respirators are NIOSH-approved N100 or CEN-approved FFP3 particulate respirators. These are to be only used as a backup to local exhaust ventilation or other engineering controls. If the respirator is the only means of protection, a full-face supplied air respirator must be used.

**9. PHYSICAL AND CHEMICAL PROPERTIES****9.1 Information on Basic Physical and Chemical Properties****A) Appearance****B) Odour**

Light Yellow Solid  
**C) Odour Threshold**  
No data available  
**E) Melting Point/Freezing Point**  
213-215°C  
**G) Flash point**  
No data available  
**I) Flammability (Solid/Gas)**  
No data available  
**K) Vapour Pressure**  
No data available  
**M) Relative Density**  
No data available  
**O) Partition Coefficient: n-octanol/water**  
No data available  
**Q) Decomposition Temperature**  
No data available  
**S) Explosive Properties**  
No data available

No data available  
**D) pH**  
No data available  
**F) Initial Boiling Point/Boiling Range**  
No data available  
**H) Evaporation Rate**  
No data available  
**J) Upper/Lower Flammability/Explosive Limits**  
No data available  
**L) Vapour Density**  
No data available  
**N) Solubility**  
Chloroform (Slightly)  
**P) Auto-Ignition Temperature**  
No data available  
**R) Viscosity**  
No data available  
**T) Oxidizing Properties**  
No data available

**9.2 Other 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

In the event of fire: See section 5. Other decomposition products: No data available.

## 11. TOXICOLOGICAL INFORMATION

### 11.1 Information on Toxicological Effects

#### A) Acute Toxicity

Oral LD50: No data available.

Inhalation LC50: No data available.

Dermal LD50: No data available.

#### B) Skin Corrosion/Irritation

No data available

#### C) Serious Eye Damage/Irritation

No data available

#### D) Respiratory or Skin Sensitization

No data available

#### E) Germ Cell Mutagenicity

No data available

#### F) Carcinogenicity

Probable human carcinogen.

This compound has been designated by the IARC as Group 2A: Probably carcinogenic to humans.

#### G) Reproductive Toxicity/Teratogenicity

No data available

**H) Single Target Organ Toxicity - Single Exposure**

No data available

**I) Single Target Organ Toxicity - Repeated Exposure**

No data available

**J) Aspiration Hazard**

No data available

**K) Potential Health Effects and Routes of Exposure****Inhalation**

May be harmful if inhaled. May cause respiratory tract irritation.

**Ingestion**

May be harmful if swallowed.

**Skin**

May be harmful if absorbed through skin. May cause skin irritation.

**Eyes**

May cause eye irritation.

**L) Signs and Symptoms of Exposure**

The most important known symptoms and effects are described in the labeling (see section 2.2) and/or section 11.

To the best of our knowledge, the chemical, physical, and toxicological properties of this material have not been thoroughly investigated.

**M) Additional Information**

RTECS: DF6350000

**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**

No data available.

**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****A) Product**

Product may be burned in an incinerator equipped with afterburner and scrubber. Excess and expired materials are to be offered to a licensed hazardous material disposal company. Ensure that all Federal and Local regulations regarding the disposal and destruction of this material are followed.

**B) Contaminated Packaging**

Dispose of as above.

**C) Other Considerations**

Product is not to be disposed of in sanitary sewers, storm sewers, or landfills.

**14. TRANSPORT INFORMATION****14.1 UN Number**

DOT (US): UN3077

IATA: UN3077

IMDG: UN3077

ADR/RID: UN3077

**14.2 UN Proper Shipping Name**

DOT (US)/IATA:

Environmentally hazardous substance, solid, n.o.s. (Benzo[k]fluoranthene)

IMDG/ARD/RID:

ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Benzo[k]fluoranthene)

**14.3 Transport Hazard Class(es)**

DOT (US): 9

IATA: 9

IMDG: 9

ADR/RID: 9

**14.4 Packing Group**

DOT (US): III

IATA: III

IMDG: III

ADR/RID: III

**14.5 Environmental Hazards**

DOT (US): None

IATA: None

IMDG: None

ADR/RID: None

**14.6 Special Precautions for User**

None

**15. REGULATORY INFORMATION**

This safety data sheet complies with the requirements of WHMIS (Canada), OSHA 1910.1200 (US), and EU Regulation EC No. 1907/2006 (European Union).

**15.1 Safety, Health and Environmental Regulations/Legislation Specific for the Substance or Mixture****A) Canada**

**DSL/NDSL Status:** This product is not listed on the Canadian DSL/NDSL.

**B) United States**

**TSCA Status:** This product is not listed on the US EPA TSCA.

**C) European Union**

**ECHA Status:** This product is not registered with the EU ECHA.

**15.2 Chemical Safety Assessment**

No data available

**16. OTHER INFORMATION****16.1 Revision History**

Original Publication Date: 7/15/2014

**16.2 List of Abbreviations**

LD50	Median lethal dose of a substance required to kill 50% of a test population.
LC50	Medial lethal concentration of a substance required to kill 50% of a test population.
LDLo	Lowest known lethal dose
TDLo	Lowest known toxic dose
IARC	International Agency for Research on Cancer
NTP	National Toxicology Program
RTECS	Registry of Toxic Effects of Chemical Substances

**16.3 Further Information**

Copyright 2015. Toronto Research Chemicals Inc. Copies may be made for internal use only. The above information is believed to be correct to the best of our knowledge, but is to be only used as a guide. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated. Please take all due care when handling this product.

## SAFETY DATA SHEET

Revision Date 19-Jan-2018

Revision Number 3

### 1. Identification

**Product Name** 1,2-Benzanthracene

**Cat No. :** AC105250000; AC105250010; AC105252500

**Synonyms** Benzóalanthracene; Tetraphene

**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	Acros Organics
One Reagent Lane	One Reagent Lane
Fair Lawn, NJ 07410	Fair Lawn, NJ 07410
Tel: (201) 796-7100	

**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)

Carcinogenicity	Category 1B
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**Label Elements**

**Signal Word**

Danger

**Hazard Statements**

May cause cancer

**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

**Response**

IF exposed or concerned: Get medical attention/advice

**Storage**

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

WARNING. Cancer - <https://www.p65warnings.ca.gov/>.

### 3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Benz[a]anthracene	56-55-3	99

### 4. First-aid measures

<b>Eye Contact</b>	Immediate medical attention is required. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
<b>Skin Contact</b>	Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Immediate medical attention is required.
<b>Inhalation</b>	Remove from exposure, lie down. Remove to fresh air. If not breathing, give artificial respiration. Immediate medical attention is required.
<b>Ingestion</b>	Call a physician immediately. Clean mouth with water.
<b>Most important symptoms and effects</b>	No information available.
<b>Notes to Physician</b>	Treat symptomatically

### 5. Fire-fighting measures

<b>Suitable Extinguishing Media</b>	Water spray. Carbon dioxide (CO <sub>2</sub> ). Dry chemical. Chemical foam.
<b>Unsuitable Extinguishing Media</b>	No information available
<b>Flash Point</b>	No information available
<b>Method -</b>	No information available
<b>Autoignition Temperature</b>	Not applicable
<b>Explosion Limits</b>	
<b>Upper</b>	No data available

<b>Lower</b>	No data available
<b>Sensitivity to Mechanical Impact</b>	No information available
<b>Sensitivity to Static Discharge</b>	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<sub>2</sub>).

**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**  
0

**Flammability**  
1

**Instability**  
0

**Physical hazards**  
N/A

**6. Accidental release measures****Personal Precautions**

Ensure adequate ventilation. Use personal protective equipment as required.

**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.

**7. Handling and storage****Handling**

Do not breathe dust. Do not get in eyes, on skin, or on clothing. Handle product only in closed system or provide appropriate exhaust ventilation.

**Storage**

Keep in a dry, cool and well-ventilated place. Refer product specification and/or product label for specific storage temperature requirement. 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**

Powder Solid



Appearance	Beige
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	158 - 161 °C / 316.4 - 321.8 °F
Boiling Point/Range	437.6 °C / 819.7 °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	No information available
Vapor Density	Not applicable
Specific Gravity	No information available
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	C18 H12
Molecular Weight	228.29

## 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 <sub>2</sub> )
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** 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
Benz[a]anthracene	56-55-3	Group 2B	Reasonably Anticipated	A2	X	A2

**Mutagenic Effects** Ames test: positive.

**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

Component	EU - Endocrine Disruptors Candidate List	EU - Endocrine Disruptors - Evaluated Substances	Japan - Endocrine Disruptor Information
Benz[a]anthracene	Group III Chemical	Not applicable	Not applicable

**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
Benz[a]anthracene	Not listed	Not listed	EC50 = 0.26 mg/L 15 min	LC50: = 0.01 mg/L, 96h Static (Daphnia magna) EC50: = 0.0042 mg/L, 48h (Daphnia magna)

**Persistence and Degradability** May persist

**Bioaccumulation/ Accumulation** No information available.

**Mobility** . Is not likely mobile in the environment due its low water solubility.

Component	log Pow
Benz[a]anthracene	5.61

## 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
Benz[a]anthracene - 56-55-3	U018	-

## 14. Transport information

**DOT** Not regulated

**TDG** Not regulated

#### 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 substances, solid, n.o.s.

Hazard Class 9  
Packing Group III

## 15. Regulatory information

### United States of America Inventory

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
Benz[a]anthracene	56-55-3	X	ACTIVE	-

#### Legend:

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), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDSL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
Benz[a]anthracene	56-55-3	-	X	200-280-6	-	-	-	X	-

### U.S. Federal Regulations

#### SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Benz[a]anthracene	56-55-3	99	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
Benz[a]anthracene	-	-	-	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
Benz[a]anthracene	10 lb	-

California Proposition 65 This product contains the following Proposition 65 chemicals.

Component	CAS-No	California Prop. 65	Prop 65 NSRL	Category
Benz[a]anthracene	56-55-3	Carcinogen	0.033 µg/day	Carcinogen

### U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Benz[a]anthracene	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

## 16. Other information

**Prepared By** Regulatory Affairs  
Thermo Fisher Scientific  
Email: EMSDS.RA@thermofisher.com

**Revision Date** 19-Jan-2018

**Print Date** 19-Jan-2018

**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

## 1. Identification

Product identifier	Benzo(b)fluoranthene		
Other means of identification			
Item	N-11165		
Recommended use	For Laboratory Use Only		
Recommended restrictions	None known.		
Manufacturer/Importer/Supplier/Distributor information			
Manufacturer			
Company name	Chem Service, Inc.		
Address	660 Tower Lane West Chester, PA 19380 United States		
Telephone	Toll Free	800-452-9994	
	Direct	610-692-3026	
Website	www.chemservice.com		
E-mail	info@chemservice.com		
Emergency phone number	Chemtrec US	800-424-9300	
	Chemtrec outside US	+1 703-527-3887	

## 2. Hazard(s) identification

Physical hazards	Not classified.	
Health hazards	Carcinogenicity	Category 1
Environmental hazards	Hazardous to the aquatic environment, acute hazard	Category 1
	Hazardous to the aquatic environment, long-term hazard	Category 1
OSHA defined hazards	Not classified.	
Label elements		



Signal word	Danger	
Hazard statement	May cause cancer. Very toxic to aquatic life. Very toxic to aquatic life with long lasting effects.	
Precautionary statement		
Prevention	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Avoid release to the environment. Wear protective gloves/protective clothing/eye protection/face protection.	
Response	If exposed or concerned: Get medical advice/attention. Collect spillage.	
Storage	Store locked up.	
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.	
Hazard(s) not otherwise classified (HNOC)	None known.	
Supplemental information	Not applicable.	

## 3. Composition/information on ingredients

## Substances

Chemical name	Common name and synonyms	CAS number	%
Benzo(b)fluoranthene		205-99-2	100

\*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

## 4. First-aid measures

<b>Inhalation</b>	Move to fresh air. Call a physician if symptoms develop or persist.
<b>Skin contact</b>	Wash off with soap and water. Get medical attention if irritation develops and persists.
<b>Eye contact</b>	Rinse with water. Get medical attention if irritation develops and persists.
<b>Ingestion</b>	Rinse mouth. Get medical attention if symptoms occur.
<b>Most important symptoms/effects, acute and delayed</b>	Direct contact with eyes may cause temporary irritation.
<b>Indication of immediate medical attention and special treatment needed</b>	Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.
<b>General information</b>	IF exposed or concerned: Get medical advice/attention. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

## 5. Fire-fighting measures

<b>Suitable extinguishing media</b>	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO <sub>2</sub> ).
<b>Unsuitable extinguishing media</b>	Do not use water jet as an extinguisher, as this will spread the fire.
<b>Specific hazards arising from the chemical</b>	During fire, gases hazardous to health may be formed.
<b>Special protective equipment and precautions for firefighters</b>	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
<b>Fire fighting equipment/instructions</b>	Use water spray to cool unopened containers.
<b>Specific methods</b>	Use standard firefighting procedures and consider the hazards of other involved materials.
<b>General fire hazards</b>	No unusual fire or explosion hazards noted.

## 6. Accidental release measures

<b>Personal precautions, protective equipment and emergency procedures</b>	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Keep out of low areas. Wear appropriate personal protective equipment. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.
<b>Methods and materials for containment and cleaning up</b>	This material is classified as a water pollutant under the Clean Water Act and should be prevented from contaminating soil or from entering sewage and drainage systems which lead to waterways. Stop the flow of material, if this is without risk. Collect spillage. Following product recovery, flush area with water. For waste disposal, see section 13 of the SDS.
<b>Environmental precautions</b>	Avoid release to the environment. Contact local authorities in case of spillage to drain/aquatic environment. Prevent further leakage or spillage if safe to do so. Do not contaminate water. Avoid discharge into drains, water courses or onto the ground.

## 7. Handling and storage

<b>Precautions for safe handling</b>	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Provide adequate ventilation. Wear appropriate personal protective equipment. Observe good industrial hygiene practices. Avoid release to the environment. Do not empty into drains.
<b>Conditions for safe storage, including any incompatibilities</b>	Store locked up. Store in original tightly closed container. Store away from incompatible materials (see Section 10 of the SDS).

## 8. Exposure controls/personal protection

<b>Occupational exposure limits</b>	No exposure limits noted for ingredient(s).
<b>Biological limit values</b>	No biological exposure limits noted for the ingredient(s).
<b>Appropriate engineering controls</b>	Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.
<b>Individual protection measures, such as personal protective equipment</b>	
<b>Eye/face protection</b>	Use personal protective equipment as required.

<b>Skin protection</b>	
<b>Hand protection</b>	Use personal protective equipment as required.
<b>Other</b>	Use personal protective equipment as required.
<b>Respiratory protection</b>	Use personal protective equipment as required.
<b>Thermal hazards</b>	Wear appropriate thermal protective clothing, when necessary.
<b>General hygiene considerations</b>	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

## 9. Physical and chemical properties

### Appearance

<b>Physical state</b>	Solid.
<b>Form</b>	Solid. Crystalline Solid
<b>Color</b>	Pale yellow
<b>Odor</b>	Not available.
<b>Odor threshold</b>	Not available.
<b>pH</b>	Not available.
<b>Melting point/freezing point</b>	334.4 °F (168 °C)
<b>Initial boiling point and boiling range</b>	Not available.
<b>Flash point</b>	Not available.
<b>Evaporation rate</b>	Not available.
<b>Flammability (solid, gas)</b>	Not available.
<b>Upper/lower flammability or explosive limits</b>	
<b>Flammability limit - lower (%)</b>	Not available.
<b>Flammability limit - upper (%)</b>	Not available.
<b>Explosive limit - lower (%)</b>	Not available.
<b>Explosive limit - upper (%)</b>	Not available.
<b>Vapor pressure</b>	0.0000001 kPa at 25 °C
<b>Vapor density</b>	Not available.
<b>Relative density</b>	Not available.
<b>Solubility(ies)</b>	
<b>Solubility (water)</b>	Not available.
<b>Partition coefficient (n-octanol/water)</b>	6.6
<b>Auto-ignition temperature</b>	Not available.
<b>Decomposition temperature</b>	Not available.
<b>Viscosity</b>	Not available.
<b>Other information</b>	
<b>Molecular formula</b>	C20-H12
<b>Molecular weight</b>	252.32 g/mol

## 10. Stability and reactivity

<b>Reactivity</b>	The product is stable and non-reactive under normal conditions of use, storage and transport.
<b>Chemical stability</b>	Material is stable under normal conditions.
<b>Possibility of hazardous reactions</b>	Hazardous polymerization does not occur.
<b>Conditions to avoid</b>	Contact with incompatible materials.
<b>Incompatible materials</b>	Strong oxidizing agents.
<b>Hazardous decomposition products</b>	No hazardous decomposition products are known.

## 11. Toxicological information

### Information on likely routes of exposure

Inhalation	No adverse effects due to inhalation are expected.
Skin contact	No adverse effects due to skin contact are expected.
Eye contact	Direct contact with eyes may cause temporary irritation.
Ingestion	Expected to be a low ingestion hazard.

Symptoms related to the physical, chemical and toxicological characteristics	Direct contact with eyes may cause temporary irritation.
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### Information on toxicological effects

Acute toxicity	Not available.
Skin corrosion/irritation	Prolonged skin contact may cause temporary irritation.
Serious eye damage/eye irritation	Direct contact with eyes may cause temporary irritation.

### Respiratory or skin sensitization

Respiratory sensitization	Not available.
Skin sensitization	This product is not expected to cause skin sensitization.

Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
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Carcinogenicity	May cause cancer.
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#### IARC Monographs. Overall Evaluation of Carcinogenicity

Benzo(b)fluoranthene (CAS 205-99-2) 2B Possibly carcinogenic to humans.

#### US. National Toxicology Program (NTP) Report on Carcinogens

Benzo(b)fluoranthene (CAS 205-99-2) Reasonably Anticipated to be a Human Carcinogen.

#### US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

Reproductive toxicity	This product is not expected to cause reproductive or developmental effects.
Specific target organ toxicity - single exposure	Not classified.
Specific target organ toxicity - repeated exposure	Not classified.
Aspiration hazard	Not available.
Chronic effects	Prolonged exposure may cause chronic effects.

## 12. Ecological information

Ecotoxicity	Very toxic to aquatic life with long lasting effects. Accumulation in aquatic organisms is expected.
Persistence and degradability	No data is available on the degradability of this product.
Bioaccumulative potential	Not available.

#### Partition coefficient n-octanol / water (log Kow)

6.6

Mobility in soil	No data available.
Other adverse effects	No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

## 13. Disposal considerations

Disposal instructions	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. This material and its container must be disposed of as hazardous waste. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.



**Waste from residues / unused products**

Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

**Contaminated packaging**

Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

**14. Transport information****DOT**

UN number	UN3077
UN proper shipping name	Environmentally hazardous substances, solid, n.o.s. (Benzo(b)fluoranthene RQ = 1 LBS)
Transport hazard class(es)	
Class	9
Subsidiary risk	-
Label(s)	9
Packing group	III
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Special provisions	8, 146, 335, A112, B54, IB8, IP3, N20, T1, TP33
Packaging exceptions	155
Packaging non bulk	213
Packaging bulk	240

**IATA**

UN number	UN3077
UN proper shipping name	Environmentally hazardous substance, solid, n.o.s. (Benzo(b)fluoranthene)
Transport hazard class(es)	
Class	9
Subsidiary risk	-
Packing group	III
Environmental hazards	No.
ERG Code	9L
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Other information	
Passenger and cargo aircraft	Allowed.
Cargo aircraft only	Allowed.

**IMDG**

UN number	UN3077
UN proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Benzo(b)fluoranthene)
Transport hazard class(es)	
Class	9
Subsidiary risk	-
Packing group	III
Environmental hazards	
Marine pollutant	No.
EmS	F-A, S-F
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not applicable.

**DOT; IATA; IMDG****General information**

DOT Regulated Marine Pollutant. IMDG Regulated Marine Pollutant.

## 15. Regulatory information

### US federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.  
One or more components are not listed on TSCA.

#### TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

#### CERCLA Hazardous Substance List (40 CFR 302.4)

Benzo(b)fluoranthene (CAS 205-99-2) Listed.

#### SARA 304 Emergency release notification

Not regulated.

#### US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

### Superfund Amendments and Reauthorization Act of 1986 (SARA)

#### Hazard categories

Immediate Hazard - No  
Delayed Hazard - Yes  
Fire Hazard - No  
Pressure Hazard - No  
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.
Benzo(b)fluoranthene	205-99-2	100

### Other federal regulations

#### Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Benzo(b)fluoranthene (CAS 205-99-2)

#### Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

#### Clean Water Act (CWA) Section 112(r) (40 CFR 68.130)

Priority pollutant  
Toxic pollutant

#### Safe Drinking Water Act (SDWA)

Not regulated.

### US state regulations

#### US - New Jersey RTK - Substances: Listed substance

Benzo(b)fluoranthene (CAS 205-99-2)

#### US - Pennsylvania RTK - Hazardous Substances: Special hazard

Benzo(b)fluoranthene (CAS 205-99-2)

#### US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)

Not listed.

#### US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))

Benzo(b)fluoranthene (CAS 205-99-2)

#### US. Massachusetts RTK - Substance List

Benzo(b)fluoranthene (CAS 205-99-2)

#### US. New Jersey Worker and Community Right-to-Know Act

Benzo(b)fluoranthene (CAS 205-99-2)

#### US. Pennsylvania RTK - Hazardous Substances

Benzo(b)fluoranthene (CAS 205-99-2)

#### US. Pennsylvania Worker and Community Right-to-Know Law

Benzo(b)fluoranthene (CAS 205-99-2)

#### US. Rhode Island RTK

Benzo(b)fluoranthene (CAS 205-99-2)

**US. California Proposition 65**

WARNING: This product contains a chemical known to the State of California to cause cancer.

**US - California Proposition 65 - CRT: Listed date/Carcinogenic substance**

Benzo(b)fluoranthene (CAS 205-99-2)

Listed: July 1, 1987

**International Inventories**

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	No
Canada	Domestic Substances List (DSL)	No
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	No
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)	No
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	No

\*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**

**Issue date** 04-29-2015

**Version #** 01

**NFPA ratings** Health: 0  
Flammability: 0  
Instability: 0

**Disclaimer**

The above information is believed to be correct on the date it was last revised and must not be considered all inclusive. The information has been obtained only by a search of available literature and is only a guide for handling the chemicals. OSHA regulations require that if other hazards become evident, an upgraded SDS must be made available to the employee within three months. RESPONSIBILITY for updates lies with the employer and not with CHEM SERVICE, Inc.

Persons not specifically and properly trained should not handle this chemical or its container. This product is furnished FOR LABORATORY USE ONLY! Our products may NOT BE USED as drugs, cosmetics, agricultural or pesticide products, food additives or as household chemicals.

This Safety Data Sheet (SDS) is intended only for use with Chem Service, Inc. products and should not be relied on for use with materials from any other supplier even if the chemical name(s) on the product are identical! Whenever using an SDS for a solution or mixture the user should refer to the SDS for every component of the solution or mixture. Chem Service warrants that this SDS is based upon the most current information available to Chem Service at the time it was last revised. THIS WARRANTY IS EXCLUSIVE, AND CHEM SERVICE, INC. MAKES NO OTHER WARRANTY, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. This SDS is provided gratis and CHEM SERVICE, INC. SHALL NOT BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR CONTINGENT DAMAGES.

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This product is furnished FOR LABORATORY USE ONLY.

# SAFETY DATA SHEET

Revision Date 14-Feb-2020

Revision Number 2

## 1. Identification

**Product Name** Benzo[a]pyrene

**Cat No. :** 15856

**CAS-No** 50-32-8  
**Synonyms** Benzo[def]chrysene.; 3,4-Benzopyrene; 3,4-Benzpyrene

**Recommended Use** Laboratory chemicals.  
**Uses advised against** Food, drug, pesticide or biocidal product use.  
**Details of the supplier of the safety data sheet**

**Company**

Alfa Aesar  
Thermo Fisher Scientific Chemicals, Inc.  
30 Bond Street  
Ward Hill, MA 01835-8099  
Tel: 800-343-0660  
Fax: 800-322-4757  
**Email:** tech@alfa.com  
www.alfa.com

**Emergency Telephone Number**

During normal business hours (Monday-Friday, 8am-7pm EST), call (800) 343-0660.  
After normal business hours, call Carechem 24 at (866) 928-0789.

## 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
Germ Cell Mutagenicity	Category 1B
Carcinogenicity	Category 1A
Reproductive Toxicity	Category 1B

**Label Elements****Signal Word**

Danger

**Hazard Statements**

May cause an allergic skin reaction  
May cause genetic defects  
May cause cancer  
May damage fertility. May damage the unborn child

**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  
Avoid breathing dust/fume/gas/mist/vapors/spray  
Contaminated work clothing should not be allowed out of the workplace  
Wear protective gloves

**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)**

Very toxic to aquatic life with long lasting effects  
WARNING. Cancer - <https://www.p65warnings.ca.gov/>.

### 3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Benzo[a]pyrene	50-32-8	> 96

### 4. First-aid measures

<b>General Advice</b>	If symptoms persist, call a physician.
<b>Eye Contact</b>	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.
<b>Skin Contact</b>	Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.
<b>Inhalation</b>	Remove to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur.
<b>Ingestion</b>	Clean mouth with water and drink afterwards plenty of water. Get medical attention if symptoms occur.
<b>Most important symptoms and effects</b>	None reasonably foreseeable. . 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
<b>Notes to Physician</b>	Treat symptomatically

### 5. Fire-fighting measures

**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<sub>2</sub>).

**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**  
2

**Flammability**  
1

**Instability**  
0

**Physical hazards**  
N/A

## 6. Accidental release measures

**Personal Precautions**

Ensure adequate ventilation. Use personal protective equipment as required. 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.

**Methods for Containment and Clean Up**

Sweep up and shovel into suitable containers for disposal. Keep in suitable, closed containers for disposal.

## 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. Avoid dust formation.

**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	Mexico OEL (TWA)
Benzo[a]pyrene		TWA: 0.2 mg/m <sup>3</sup>		

Legend

OSHA - Occupational Safety and Health Administration

**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

<b>Physical State</b>	Powder Solid
<b>Appearance</b>	Dark yellow
<b>Odor</b>	aromatic
<b>Odor Threshold</b>	No information available
<b>pH</b>	Not applicable
<b>Melting Point/Range</b>	175 - 179 °C / 347 - 354.2 °F
<b>Boiling Point/Range</b>	495 °C / 923 °F @ 760 mmHg
<b>Flash Point</b>	No information available
<b>Evaporation Rate</b>	Not applicable
<b>Flammability (solid,gas)</b>	No information available
<b>Flammability or explosive limits</b>	
Upper	No data available
Lower	No data available
<b>Vapor Pressure</b>	No information available
<b>Vapor Density</b>	Not applicable
<b>Specific Gravity</b>	No information available
<b>Solubility</b>	Insoluble in water
<b>Partition coefficient; n-octanol/water</b>	No data available
<b>Autoignition Temperature</b>	Not applicable
<b>Decomposition Temperature</b>	No information available
<b>Viscosity</b>	Not applicable
<b>Molecular Formula</b>	C <sub>20</sub> H <sub>12</sub>
<b>Molecular Weight</b>	252.31

## 10. Stability and reactivity

<b>Reactive Hazard</b>	None known, based on information available
<b>Stability</b>	Stable under normal conditions.
<b>Conditions to Avoid</b>	Incompatible products.
<b>Incompatible Materials</b>	Oxidizing agent
<b>Hazardous Decomposition Products</b>	Carbon monoxide (CO), Carbon dioxide (CO <sub>2</sub> )
<b>Hazardous Polymerization</b>	Hazardous polymerization does not occur.
<b>Hazardous Reactions</b>	None under normal processing.

## 11. Toxicological information

**Acute Toxicity****Product Information****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** May cause sensitization by skin contact

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

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Benzo[a]pyrene	50-32-8	Group 1	Reasonably Anticipated	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)*

*Known - Known Carcinogen*

*Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen*

*A1 - Known Human Carcinogen*

*A2 - Suspected Human Carcinogen*

*A3 - Animal Carcinogen*

*ACGIH: (American Conference of Governmental Industrial Hygienists)*

*NTP: (National Toxicity Program)*

*ACGIH: (American Conference of Governmental Industrial Hygienists)*

**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** 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

Component	EU - Endocrine Disruptors Candidate List	EU - Endocrine Disruptors - Evaluated Substances	Japan - Endocrine Disruptor Information
Benzo[a]pyrene	Group III Chemical	Not applicable	Not applicable

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

## 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** May persist

**Bioaccumulation/ Accumulation** No information available.

**Mobility** Is not likely mobile in the environment due its low water solubility.

Component	log Pow
Benzo[a]pyrene	6.06

## 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
Benzo[a]pyrene - 50-32-8	U022	-

## 14. Transport information

### DOT

UN-No	UN3077
Proper Shipping Name	Environmentally hazardous substances, solid, n.o.s.
Technical Name	Benzo[a]pyrene
Hazard Class	9
Packing Group	III

### TDG

UN-No	UN3077
Proper Shipping Name	Environmentally hazardous substances, solid, n.o.s.
Hazard Class	9
Packing Group	III

### IATA

UN-No	UN3077
Proper Shipping Name	Environmentally hazardous substances, solid, n.o.s.
Hazard Class	9
Packing Group	III

### IMDG/IMO

UN-No	UN3077
Proper Shipping Name	Environmentally hazardous substances, solid, n.o.s.
Hazard Class	9
Packing Group	III

## 15. Regulatory information

### United States of America Inventory

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
Benzo[a]pyrene	50-32-8	X	ACTIVE	-

#### Legend:

**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/NDL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
Benzo[a]pyrene	50-32-8	X	-	200-028-5	X	-	-	X	KE-05-0184

### U.S. Federal Regulations

#### SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Benzo[a]pyrene	50-32-8	> 96	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
Benzo[a]pyrene	-	-	X	X

**Clean Air Act** Not applicable

**OSHA - Occupational Safety and Health Administration** Not applicable

**CERCLA** Not applicable

Component	Hazardous Substances RQs	CERCLA EHS RQs
Benzo[a]pyrene	1 lb	-

**California Proposition 65** This product contains the following Proposition 65 chemicals.

Component	CAS-No	California Prop. 65	Prop 65 NSRL	Category
Benzo[a]pyrene	50-32-8	Carcinogen	0.06 µg/day	Carcinogen

**U.S. State Right-to-Know Regulations**

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Benzo[a]pyrene	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

## 16. Other information

**Prepared By** Health, Safety and Environmental Department  
 Email: tech@alfa.com  
 www.alfa.com

**Revision Date** 14-Feb-2020

**Print Date** 14-Feb-2020

**Revision Summary** SDS authoring systems update, replaces ChemGes SDS No. 50-32-8/1.

**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 03-May-2012

Revision Date 19-Jan-2018

Revision Number 4

### 1. Identification

**Product Name** Benzo[ghi]perylene

**Cat No. :** AC105550000; AC105550050; AC105550250; AC105551000

**CAS-No** 191-24-2

**Synonyms** 1,12-Benzoperylene

**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	Acros Organics
One Reagent Lane	One Reagent Lane
Fair Lawn, NJ 07410	Fair Lawn, NJ 07410
Tel: (201) 796-7100	

**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 %
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Benzo(ghi)perylene	191-24-2	>95
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#### 4. First-aid measures

<b>Eye Contact</b>	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.
<b>Skin Contact</b>	Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Get medical attention.
<b>Inhalation</b>	Remove from exposure, lie down. Remove to fresh air. If not breathing, give artificial respiration. Get medical attention.
<b>Ingestion</b>	Clean mouth with water. Get medical attention.
<b>Most important symptoms and effects</b>	No information available.
<b>Notes to Physician</b>	Treat symptomatically

#### 5. Fire-fighting measures

<b>Unsuitable Extinguishing Media</b>	No information available
<b>Flash Point</b>	No information available
<b>Method -</b>	No information available
<b>Autoignition Temperature</b>	No information available
<b>Explosion Limits</b>	
<b>Upper</b>	No data available
<b>Lower</b>	No data available
<b>Sensitivity to Mechanical Impact</b>	No information available
<b>Sensitivity to Static Discharge</b>	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<sub>2</sub>).

#### 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**  
0

**Flammability**  
1

**Instability**  
0

**Physical hazards**  
N/A

#### 6. Accidental release measures

<b>Personal Precautions</b>	Ensure adequate ventilation. Use personal protective equipment as required.
<b>Environmental Precautions</b>	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.
<b>Methods for Containment and Clean Up</b>	Avoid dust formation. Sweep up and shovel into suitable containers for disposal. Do not let this chemical enter the environment.

#### 7. Handling and storage

<b>Handling</b>	Avoid contact with skin and eyes. Do not breathe dust.
<b>Storage</b>	Keep in a dry, cool and well-ventilated place. Refer product specification and/or product label for specific storage temperature requirement. Keep container tightly closed.

## 8. Exposure controls / personal protection

<b>Exposure Guidelines</b>	This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.
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<b>Engineering Measures</b>	Ensure adequate ventilation, especially in confined areas.
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### Personal Protective Equipment

<b>Eye/face Protection</b>	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.
<b>Skin and body protection</b>	Wear appropriate protective gloves and clothing to prevent skin exposure.
<b>Respiratory Protection</b>	No protective equipment is needed under normal use conditions.
<b>Hygiene Measures</b>	Handle in accordance with good industrial hygiene and safety practice.

## 9. Physical and chemical properties

<b>Physical State</b>	Solid
<b>Appearance</b>	Yellow
<b>Odor</b>	No information available
<b>Odor Threshold</b>	No information available
<b>pH</b>	No information available
<b>Melting Point/Range</b>	276 - 280 °C / 528.8 - 536 °F
<b>Boiling Point/Range</b>	> 500 °C @ 760 mmHg
<b>Flash Point</b>	No information available
<b>Evaporation Rate</b>	Not applicable
<b>Flammability (solid,gas)</b>	No information available
<b>Flammability or explosive limits</b>	
Upper	No data available
Lower	No data available
<b>Vapor Pressure</b>	No information available
<b>Vapor Density</b>	Not applicable
<b>Specific Gravity</b>	No information available
<b>Solubility</b>	Insoluble in water
<b>Partition coefficient; n-octanol/water</b>	No data available
<b>Autoignition Temperature</b>	No information available
<b>Decomposition Temperature</b>	No information available
<b>Viscosity</b>	Not applicable
<b>Molecular Formula</b>	C22 H12
<b>Molecular Weight</b>	276.33

## 10. Stability and reactivity

<b>Reactive Hazard</b>	None known, based on information available
<b>Stability</b>	Stable under recommended storage conditions.
<b>Conditions to Avoid</b>	Excess heat. Exposure to light. Incompatible products.

<b>Incompatible Materials</b>	Strong oxidizing agents
<b>Hazardous Decomposition Products</b>	Carbon monoxide (CO), Carbon dioxide (CO <sub>2</sub> )
<b>Hazardous Polymerization</b>	Hazardous polymerization does not occur.
<b>Hazardous Reactions</b>	None under normal processing.

## 11. Toxicological information

### Acute Toxicity

**Product Information** No acute toxicity information is available for this product

**Component Information** No information available

**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
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.

## 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
Benzo(ghi)perylene	6.58

### 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 substances, solid, n.o.s.  
**Technical Name** Benzo(ghi)perylene  
**Hazard Class** 9  
**Packing Group** III

#### TDG

**UN-No** UN3077  
**Proper Shipping Name** Environmentally hazardous substances, solid, n.o.s.  
**Hazard Class** 9  
**Packing Group** III

#### IATA

**UN-No** UN3077  
**Proper Shipping Name** Environmentally hazardous substances, solid, n.o.s.  
**Hazard Class** 9  
**Packing Group** III

#### IMDG/IMO

**UN-No** UN3077  
**Proper Shipping Name** Environmentally hazardous substances, solid, n.o.s.  
**Hazard Class** 9  
**Packing Group** III

### 15. Regulatory information

#### United States of America Inventory

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
Benzo(ghi)perylene	191-24-2	-	-	-

#### Legend:

**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/NDL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
Benzo(ghi)perylene	191-24-2	-	-	205-883-8	-	-	-	-	-

#### U.S. Federal Regulations

##### SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Benzo(ghi)perylene	191-24-2	>95	1.0 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
Benzo(ghi)perylene	-	-	-	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.

**U.S. State Right-to-Know Regulations**

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

## 16. Other information

**Prepared By** Regulatory Affairs  
Thermo Fisher Scientific  
Email: EMSDS.RA@thermofisher.com

**Creation Date** 03-May-2012

**Revision Date** 19-Jan-2018

**Print Date** 19-Jan-2018

**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**

Revision Date 17-Jan-2018

Revision Number 3

**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  
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 %
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Cadmium	7440-43-9	100
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#### 4. First-aid measures

<b>General Advice</b>	Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.
<b>Eye Contact</b>	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.
<b>Skin Contact</b>	Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.
<b>Inhalation</b>	Move 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.
<b>Ingestion</b>	Do not induce vomiting. Call a physician or Poison Control Center immediately.
<b>Most important symptoms and effects</b>	None reasonably foreseeable. . Kidney disorders: May cause harm to the unborn child: Blood disorders
<b>Notes to Physician</b>	Treat symptomatically

#### 5. Fire-fighting measures

<b>Unsuitable Extinguishing Media</b>	No information available
<b>Flash Point</b>	No information available
<b>Method -</b>	No information available
<b>Autoignition Temperature</b>	No information available
<b>Explosion Limits</b>	
<b>Upper</b>	No data available
<b>Lower</b>	No data available
<b>Sensitivity to Mechanical Impact</b>	No information available
<b>Sensitivity to Static Discharge</b>	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 in air. Pyrophoric properties of solids and liquids. Do not allow run-off from fire fighting to enter drains or water courses.

#### Hazardous Combustion Products

Highly 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

<b>Health</b>	<b>Flammability</b>	<b>Instability</b>	<b>Physical hazards</b>
4	1	0	N/A

#### 6. Accidental release measures

<b>Personal Precautions</b>	Ensure adequate ventilation. Use personal protective equipment. Avoid dust formation. Keep people away from and upwind of spill/leak. Evacuate personnel to safe areas.
<b>Environmental Precautions</b>	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. Avoid dust formation.

## 7. Handling and storage

**Handling** Wear personal protective equipment. Do not get in eyes, on skin, or on clothing. Avoid dust formation. Use only under a chemical fume hood. Do not breathe vapors/dust. Do not ingest.

**Storage** Keep containers tightly closed in a dry, cool and well-ventilated place. Store under an inert atmosphere.

## 8. Exposure controls / personal protection

### Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Cadmium	TWA: 0.01 mg/m <sup>3</sup> TWA: 0.002 mg/m <sup>3</sup>	Ceiling: 0.3 mg/m <sup>3</sup> Ceiling: 0.6 mg/m <sup>3</sup> (Vacated) STEL: 0.3 ppm TWA: 0.1 mg/m <sup>3</sup> TWA: 0.2 mg/m <sup>3</sup> TWA: 5 µg/m <sup>3</sup>	IDLH: 9 mg/m <sup>3</sup>	TWA: 0.01 mg/m <sup>3</sup> TWA: 0.002 mg/m <sup>3</sup>

### 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** 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** When using, do not eat, drink or smoke. Provide regular cleaning of equipment, work area and clothing. Avoid contact with skin, eyes and 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

<b>Physical State</b>	Solid
<b>Appearance</b>	Silver
<b>Odor</b>	Odorless
<b>Odor Threshold</b>	No information available
<b>pH</b>	No information available
<b>Melting Point/Range</b>	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	Highly 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/m <sup>3</sup> ( 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)

ACGIH: (American Conference of Governmental Industrial Hygienists)

*Known - Known Carcinogen*

*Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen*

*A1 - Known Human Carcinogen*

*A2 - Suspected Human Carcinogen*

*A3 - Animal Carcinogen*

ACGIH: (American Conference of Governmental Industrial Hygienists)

<b>Mutagenic Effects</b>	Possible risk of irreversible effects
<b>Reproductive Effects</b>	Possible risk of impaired fertility. May cause harm to the unborn child.
<b>Developmental Effects</b>	No information available.
<b>Teratogenicity</b>	No information available.
<b>STOT - single exposure</b>	Respiratory system
<b>STOT - repeated exposure</b>	Kidney Blood
<b>Aspiration hazard</b>	No information available
<b>Symptoms / effects, both acute and delayed</b>	Kidney disorders: May cause harm to the unborn child: Blood disorders
<b>Endocrine Disruptor Information</b>	No information available
<b>Other Adverse Effects</b>	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 (Cyprinus carpio) LC50: = 0.006 mg/L, 96h static (Oncorhynchus mykiss) LC50: = 0.003 mg/L, 96h	Not listed	EC50: = 0.0244 mg/L, 48h Static (Daphnia magna)

		flow-through (Oncorhynchus mykiss)		
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**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 SOLIDS, FLAMMABLE, ORGANIC, N.O.S.  
 Proper 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

#### International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Cadmium	X	X	-	231-152-8	-		X	-	X	X	KE-04397

#### 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 %
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

Component	HAPS Data	Class 1 Ozone Depleters	Class 2 Ozone Depleters
Cadmium	X		-

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

## 16. Other information



<b>Prepared By</b>	Regulatory Affairs Thermo Fisher Scientific Email: EMSDS.RA@thermofisher.com
<b>Revision Date</b>	17-Jan-2018
<b>Print Date</b>	17-Jan-2018
<b>Revision Summary</b>	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 (SDS)

### SECTION 1 — CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

#### Chromium Metal

**Signal Word**  
**WARNING**

Flinn Scientific, Inc. P.O. Box 219, Batavia, IL 60510 (800) 452-1261

Chemtrec Emergency Phone Number: (800) 424-9615

Pictograms

### SECTION 2 — HAZARDS IDENTIFICATION

Hazard class: Hazardous to the aquatic environment, chronic toxicity (Category 1). Very toxic to aquatic life with long lasting effects (H410).



Chromium (CAS 7440-47-3) is an IARC Group 3-Not Classifiable as to its carcinogenicity to humans

### SECTION 3 — COMPOSITION, INFORMATION ON INGREDIENTS

Component Name	CAS Number	Formula	Formula Weight	Concentration
Chromium	7440-47-3	Cr	52	
Synonyms: Chrome				

### SECTION 4 — FIRST AID MEASURES

**If exposed or concerned:** Get medical advice or attention (P308+P313).

**If inhaled:** Remove victim to fresh air and keep at rest in a position comfortable for breathing (P304+P340).

**If in eyes:** Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do so. Continue rinsing.

**If on skin:** Wash with plenty of water.

**If swallowed:** Rinse mouth. Immediately call a POISON CENTER or physician (P301+P310+P330).

### SECTION 5 — FIRE FIGHTING MEASURES

Nonflammable, noncombustible metal.

**NFPA Code**

Moderate fire hazard in the form of dust.

None established

In case of fire: Use a tri-class dry chemical fire extinguisher.

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**SECTION 6 — ACCIDENTAL RELEASE MEASURES**

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Remove all ignition sources and water. Sweep up the spill, place in a sealed bag or container, and dispose. Ventilate area and wash spill site after material pickup is complete. See Sections 8 and 13 for further information.

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**SECTION 7 — HANDLING AND STORAGE**

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Flinn Suggested Chemical Storage Pattern: Inorganic #1. Store with metals and metal hydrides.

Use only in a hood or well-ventilated area (P271).

---

**SECTION 8 — EXPOSURE CONTROLS, PERSONAL PROTECTION**

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Wear protective gloves, protective clothing, and eye protection. Wash hands thoroughly after handling (P264). Use only in a hood or well-ventilated area (P271).

Exposure guidelines: PEL 1 mg/m<sup>3</sup> (OSHA); TLV 0.5 mg/m<sup>3</sup> (ACGIH)

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**SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES**

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Silver, metallic solid. Odorless.

Boiling point: 2680 °C

Soluble: Strong alkalis and acids, except nitric.

Melting point: 1900 °C

Insoluble in water.

Specific gravity: 7.0-7.3

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**SECTION 10 — STABILITY AND REACTIVITY**

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Avoid contact with strong acids and strong oxidizers.

Shelf life: Indefinite, if stored properly.

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**SECTION 11 — TOXICOLOGICAL INFORMATION**

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Acute effects: Toxic, irritant.

ORL-RAT LD<sub>50</sub>: N.A.

Chronic effects: N.A.

IHL-RAT LC<sub>50</sub>: N.A.

Target organs: N.A.

SKN-RBT LD<sub>50</sub>: N.A.

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**SECTION 12 — ECOLOGICAL INFORMATION**

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Data not yet available.

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**SECTION 13 — DISPOSAL CONSIDERATIONS**

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Please review all federal, state and local regulations that may apply before proceeding.

Flinn Suggested Disposal Method #27f is one option.

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**SECTION 14 — TRANSPORT INFORMATION**

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Shipping name: Not regulated. Hazard class: N/A. UN number: N/A.

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**SECTION 15 — REGULATORY INFORMATION**

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TSCA-listed, EINECS-listed (231-157-5), RCRA code D007.

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**SECTION 16 — OTHER INFORMATION**

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This Safety Data Sheet (SDS) is for guidance and is based upon information and tests believed to be reliable. Flinn Scientific, Inc. makes no guarantee of the accuracy or completeness of the data and shall not be liable for any damages relating thereto. The data is offered solely for your consideration, investigation, and verification. The data should not be confused with local, state, federal or insurance mandates, regulations, or requirements and CONSTITUTE NO WARRANTY. Any use of this data and information must be determined by the science instructor to be in accordance with applicable local, state or federal laws and regulations. The conditions or methods of handling, storage, use and disposal of the product(s) described are beyond the control of Flinn Scientific, Inc. and may be beyond our knowledge. FOR THIS AND OTHER REASONS, WE DO NOT ASSUME RESPONSIBILITY AND EXPRESSLY DISCLAIM LIABILITY FOR LOSS, DAMAGE OR EXPENSE ARISING OUT OF OR IN ANY WAY CONNECTED WITH THE HANDLING, STORAGE, USE OR DISPOSAL OF THIS PRODUCT(S).

N.A. = Not available, not all health aspects of this substance have been fully investigated.

N/A = Not applicable

**Consult your copy of the Flinn Science Catalog/Reference Manual for additional information about laboratory chemicals.**

**Revision Date:** January 26, 2016

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## SAFETY DATA SHEET

Creation Date 22-Sep-2009

Revision Date 23-Jan-2018

Revision Number 3

### 1. Identification

**Product Name** cis-1,2-Dichloroethylene

**Cat No. :** AC113380000; AC113380025; AC113380100; AC113380500

**Synonyms** cis-Acetylene dichloride.

**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  
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 oral toxicity	Category 4
Acute Inhalation Toxicity - Vapors	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**

Danger

**Hazard Statements**

Highly flammable liquid and vapor  
Harmful if swallowed  
Harmful if inhaled

Causes serious eye irritation  
Causes skin irritation  
May cause respiratory irritation

**Precautionary Statements****Prevention**

Wear protective gloves/protective clothing/eye protection/face protection  
Use only outdoors or in a well-ventilated area  
Avoid breathing dust/fume/gas/mist/vapors/spray  
Keep away from heat/sparks/open flames/hot surfaces. - No smoking  
Keep container tightly closed  
Ground/bond container and receiving equipment  
Take precautionary measures against static discharge  
Do not eat, drink or smoke when using this product

**Response**

Call a POISON CENTER or doctor/physician 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 if you feel unwell

**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

**Ingestion**

Rinse mouth  
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell

**Fire**

Explosion risk in case of fire  
Fight fire with normal precautions from a reasonable distance  
Evacuate area

**Storage**

Store in a well-ventilated place. Keep cool  
Store in a closed container  
Store locked up

**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 %
cis-1,2-Dichloroethylene	156-59-2	97

### 4. First-aid measures

<b>Eye Contact</b>	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.
<b>Skin Contact</b>	Wash off immediately with plenty of water for at least 15 minutes. Get medical attention.
<b>Inhalation</b>	Remove to fresh air. Get medical attention. If not breathing, give artificial respiration.
<b>Ingestion</b>	Do NOT induce vomiting. Get medical attention.
<b>Most important symptoms and effects</b>	Difficulty in breathing. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting
<b>Notes to Physician</b>	Treat symptomatically

## 5. Fire-fighting measures

<b>Suitable Extinguishing Media</b>	Water spray. Carbon dioxide (CO <sub>2</sub> ). Dry chemical. Water mist may be used to cool closed containers. Chemical foam. Water mist may be used to cool closed containers.
<b>Unsuitable Extinguishing Media</b>	No information available
<b>Flash Point</b>	6 °C / 42.8 °F
<b>Method -</b>	No information available
<b>Autoignition Temperature</b>	440 °C / 824 °F
<b>Explosion Limits</b>	
<b>Upper</b>	12.80%
<b>Lower</b>	9.70%
<b>Sensitivity to Mechanical Impact</b>	No information available
<b>Sensitivity to Static Discharge</b>	No information available

### Specific Hazards Arising from the Chemical

Flammable. Vapors may travel to source of ignition and flash back. Containers may explode when heated. Vapors may form explosive mixtures with air.

### Hazardous Combustion Products

Carbon monoxide (CO). Carbon dioxide (CO<sub>2</sub>). Hydrogen chloride gas.

### 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**  
2

**Flammability**  
3

**Instability**  
0

**Physical hazards**  
N/A

## 6. Accidental release measures

<b>Personal Precautions</b>	Ensure adequate ventilation. Use personal protective equipment as required. Remove all sources of ignition. Take precautionary measures against static discharges. Avoid contact with skin, eyes or clothing.
<b>Environmental Precautions</b>	See Section 12 for additional Ecological Information. Do not flush into surface water or sanitary sewer system.
<b>Methods for Containment and Clean Up</b>	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

<b>Handling</b>	Ensure adequate ventilation. Wear personal protective equipment/face protection. Use spark-proof tools and explosion-proof equipment. Use only non-sparking tools. Avoid contact with skin, eyes or clothing. Avoid breathing dust/fume/gas/mist/vapors/spray. Avoid ingestion and inhalation. Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharges. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded.
<b>Storage</b>	Keep in a dry, cool and well-ventilated place. Refer product specification and/or product label for specific storage temperature requirement. Keep container tightly closed. Keep away from heat, sparks and flame. Flammables area. Keep container tightly closed in a dry and well-ventilated place.

## 8. Exposure controls / personal protection

### Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
cis-1,2-Dichloroethylene	TWA: 200 ppm			TWA: 200 ppm

### Legend

ACGIH - American Conference of Governmental Industrial Hygienists

<b>Engineering Measures</b>	Ensure adequate ventilation, especially in confined areas. Use explosion-proof electrical/ventilating/lighting/equipment. Ensure that eyewash stations and safety showers are close to the workstation location.
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### Personal Protective Equipment

<b>Eye/face Protection</b>	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.
<b>Skin and body protection</b>	Wear appropriate protective gloves and clothing to prevent skin exposure.
<b>Respiratory Protection</b>	No protective equipment is needed under normal use conditions.
<b>Hygiene Measures</b>	Handle in accordance with good industrial hygiene and safety practice.

## 9. Physical and chemical properties

<b>Physical State</b>	Liquid
<b>Appearance</b>	Colorless
<b>Odor</b>	aromatic
<b>Odor Threshold</b>	No information available
<b>pH</b>	No information available
<b>Melting Point/Range</b>	-80 °C / -112 °F
<b>Boiling Point/Range</b>	60 °C / 140 °F @ 760 mmHg
<b>Flash Point</b>	6 °C / 42.8 °F
<b>Evaporation Rate</b>	No information available
<b>Flammability (solid,gas)</b>	Not applicable
<b>Flammability or explosive limits</b>	
Upper	12.80%
Lower	9.70%
<b>Vapor Pressure</b>	201 mmHg @ 25 °C
<b>Vapor Density</b>	3.34 (Air = 1.0)
<b>Specific Gravity</b>	1.280
<b>Solubility</b>	No information available
<b>Partition coefficient; n-octanol/water</b>	No data available



Autoignition Temperature	440 °C / 824 °F
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	C2 H2 Cl2
Molecular Weight	96.94

## 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. Exposure to air. Exposure to light. Incompatible products. Exposure to moist air or water.
Incompatible Materials	Bases
Hazardous Decomposition Products	Carbon monoxide (CO), Carbon dioxide (CO <sub>2</sub> ), Hydrogen chloride gas
Hazardous Polymerization	Hazardous polymerization does not occur.
Hazardous Reactions	None under normal processing.

## 11. Toxicological information

### Acute Toxicity

#### Product Information

#### Component Information

Toxicologically Synergistic Products	No information available
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#### 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
cis-1,2-Dichloroethylene	156-59-2	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	Respiratory system
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	The toxicological properties have not been fully investigated.

## 12. Ecological information

### Ecotoxicity

Do not empty into drains. Do not flush into surface water or sanitary sewer system. Harmful 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
cis-1,2-Dichloroethylene	Not listed	Not listed	EC50 = 721 mg/L 5 min EC50 = 905 mg/L 30 min	Not listed

**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.

## 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 UN1150  
 Proper Shipping Name 1,2-DICHLOROETHYLENE  
 Hazard Class 3  
 Packing Group II

### TDG

UN-No UN1150  
 Proper Shipping Name 1,2-DICHLOROETHYLENE  
 Hazard Class 3  
 Packing Group II

### IATA

UN-No UN1150  
 Proper Shipping Name 1,2-DICHLOROETHYLENE  
 Hazard Class 3  
 Packing Group II

### IMDG/IMO

UN-No UN1150  
 Proper Shipping Name 1,2-DICHLOROETHYLENE  
 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
cis-1,2-Dichloroethylene	156-59-2	X	ACTIVE	-

### Legend:

**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/NDL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
cis-1,2-Dichloroethylene	156-59-2	-	X	205-859-7	-	X	X	X	KE-10124

**U.S. Federal Regulations**

<b>SARA 313</b>	Not applicable
<b>SARA 311/312 Hazard Categories</b>	See section 2 for more information
<b>CWA (Clean Water Act)</b>	Not applicable
<b>Clean Air Act</b>	Not applicable
<b>OSHA - Occupational Safety and Health Administration</b>	Not applicable

**CERCLA**

<b>California Proposition 65</b>	This product does not contain any Proposition 65 chemicals.
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**U.S. State Right-to-Know Regulations**

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
cis-1,2-Dichloroethylene	X	-	X	-	-

**U.S. Department of Transportation**

Reportable Quantity (RQ):	N
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

<b>U.S. Department of Homeland Security</b>	This product does not contain any DHS chemicals.
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**Other International Regulations**

<b>Mexico - Grade</b>	No information available
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**16. Other information**

<b>Prepared By</b>	Regulatory Affairs Thermo Fisher Scientific Email: EMSDS.RA@thermofisher.com
<b>Creation Date</b>	22-Sep-2009
<b>Revision Date</b>	23-Jan-2018
<b>Print Date</b>	23-Jan-2018
<b>Revision Summary</b>	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**



# 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: H-135N

Description: Dibenz(a,h)anthracene

CAS No.: 53-70-3

#### 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

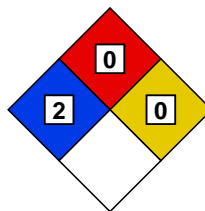
Email: edocs@accustandard.com

#### 1.4 - Emergency Telephone Number

Emergency Phone #: AccuStandard, Inc.  
1-203-786-5290  
Hours: Monday to Friday 8:00am to 5:00pm EST

### SECTION 2 - HAZARDS IDENTIFICATION

#### 2.1 - GHS Label Elements



*	2	HEALTH
0		FLAMMABILITY
0		PHYSICAL HAZARD

**Signal Word: Danger**

#### Hazard Codes:

H302 - Harmful if swallowed. (Acute toxicity, oral, category 4)

H315 - Irritating to skin. (Skin corrosion/irritation, category 2)

H320 - Irritating to eyes. (Eye damage/irritation, category 2B)

H350 - California Proposition 65 Warning: This product contains a component (or components) that may cause cancer in a concentration greater than or equal to 0.1%.

H350 - This product is or contains a component that is classified (ACGIH, IARC, NTP, OSHA) as a possible cancer hazard. (Carcinogenicity, category 1B)

H371 - May cause liver damage. (Specific target organ toxicity, single exposure, category 2)

H371 - May cause lung damage. (Specific target organ toxicity - single exposure, inhalation) Category 2

H402 - Harmful to fish and other water organisms.

H413 - May cause long-term adverse effects in the aquatic environment.

**SECTION 2 - HAZARDS IDENTIFICATION** - continued**2.1 - GHS Label Elements** - continued**Precautionary Codes:**

P202 - This product should only be used by persons trained in the safe handling of hazardous chemicals.

P235 - Store in a cool dry place.

P260 - Do not breathe dust.

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.

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.

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.

P404 - Store in a tightly closed container.

**2.2 - Other Hazards****2.2.1 - Symptom of Exposure Health/Environment**

Harmful.

May cause lung damage. (Specific target organ toxicity - single exposure, inhalation) Category 2

May cause liver damage. (Specific target organ toxicity, single exposure, category 2)

Causes photosensitivity. Exposure to light can result in allergic reactions resulting in dermatologic lesions.

Bioaccumulation of this chemical may occur. It is strongly advised that this substance does not enter the environment.

Harmful to fish and other water organisms. (H402)

May cause long-term adverse effects in the aquatic environment. (H413)

**2.2.2 - Potential Health Effects**

Irritating to eyes. (Eye damage/irritation, category 2B)

Irritating to skin. (Skin corrosion/irritation, category 2)

May be harmful if absorbed through the skin. (Acute toxicity, dermal, category 5)

Irritating to mucous membrane and upper respiratory system.

May be harmful if inhaled. (Acute toxicity, inhalation, category 5)

Harmful if swallowed. (Acute toxicity, oral, category 4)

**2.2.3 - Routes of Entry**

Inhalation, ingestion or skin contact.

**2.2.4 - Carcinogenicity**

California Proposition 65 cancer hazard.

This product is or contains a component that is classified (ACGIH, IARC, NTP, OSHA) as a possible cancer hazard. (Carcinogenicity, category 1B)

California Proposition 65 Warning: This product contains a component (or components) that may cause cancer in a concentration greater than or equal to 0.1%.

**SECTION 3 - COMPOSITION / ANALYTES DATA**

Description: Dibenz(a,h)anthracene

Synonyms: 1,2:5,6-Dibenzanthracene; 1,2:5,6-Dibenz(a)anthracene

Molecular Weight: 278.35

Molecular Formula: C<sub>22</sub>H<sub>14</sub>

EC#: 200-181-8

Index#: 601-041-00-2

Analyte	CAS Number	% Concentration	ACGIH -TLV (mg/m <sup>3</sup> )			OSHA -PEL (mg/m <sup>3</sup> )		
			TWA	STEL	Skin	TWA	STEL	Skin
Dibenz(a,h)anthracene	53-70-3	100.000						

**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: Call a physician or poison control center immediately. ONLY induce vomiting at the instructions of a physician. Never give anything by mouth to an unconscious person.

**SECTION 5 - FIRE FIGHTING MEASURES****5.1 - Flammable Properties**

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, or dry chemical 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 a self-contained breathing apparatus and appropriate Personal protection. Prevent contact with skin or eyes. Ventilate area. Avoid raising dust. Take up and containerize for proper disposal. Flush spill area with water. Comply with Federal, State, and local regulations.

**SECTION 7 - HANDLING AND STORAGE**

Store in a tightly closed container. (P404)

Store in a cool dry place. (P235)

Do not breathe dust. (P260)

Use with adequate ventilation.

Do not get in eyes, on skin or clothing. (P262)

Avoid prolonged or repeated exposure.

This product should only be 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 Hygiene 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.

Compatible chemical-resistant protective gloves must be worn to prevent skin contact. Inspect gloves prior to use. Use proper glove removal technique to avoid contact with product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash hands thoroughly and dry.

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: Crystalline solid

Odor: N/A

Odor Threshold: N/A

pH: N/A

Melting Point: 504 °F / 262 °C

Boiling Point: 975 °F / 524 °C

Flash Point: N/A

Evaporation Rate (Butyl Acetate=1): N/A

Flammability Class: N/A

Lower Flammability Level: N/A

Upper Flammability Level: N/A

Vapor Pressure: N/A

Vapor Density (Air = 1): N/A

Specific Gravity: 1.28 g/cm<sup>3</sup>



**SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES** - continued

Solubility in Water: Insoluble  
Partition Coefficient: log Pow: 6.5  
Autoignition Temperature: N/A  
Decomposition Temperature: N/A  
Viscosity: N/A  
VOC Content: N/A  
Percent Volatile: Negligible

**SECTION 10 - STABILITY AND REACTIVITY**

Stability: Stable  
Materials to Avoid: Oxidizers  
Hazardous Decomposition: Oxides of carbon  
Hazardous Polymerization: Will not occur  
Condition to Avoid: Excessive heat

**SECTION 11 - TOXICOLOGICAL INFORMATION****Human Health Toxicity**

See section 2 for specific toxicological information for the ingredients of this product.

LD50 (Oral): N/A

LD50 (Dermal) : N/A

LC50 (Inhalation): N/A

Dibenz[a,h]anthracene produced carcinomas in mice following oral or dermal exposure and injection site tumors in several species and has induced DNA damage and gene mutations in bacteria.

WARNING: This product contains chemical(s) known to the state of California to cause cancer.

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): N/A

EC50 (Aquatic Invertebrate): N/A

BCF: N/A

The potential for bioconcentration in aquatic organisms is considered high.

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: UN3077

UN Shipping Class: 9

UN Packing Group: III

UN Proper Shipping Name: Environmentally hazardous substance, solid, n.o.s. (Dibenz(a,h)anthracene)

Poison by Inhalation: No

Marine Pollutant: No

**SECTION 15 - REGULATORY INFORMATION**

WARNING: This product contains chemical(s) known to the state of California to cause cancer.

This product is subject to SARA section 313 reporting requirements.

The CAS number of this product is 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.

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

Creation Date 06-Aug-2010

Revision Date 17-Jan-2018

Revision Number 6

### 1. Identification

**Product Name** Ethylbenzene

**Cat No. :** O2751-1

**CAS-No** 100-41-4  
**Synonyms** Ethylbenzol; Phenylethane

**Recommended Use** Laboratory chemicals.  
**Uses advised against** Not for food, drug, pesticide or biocidal product use

#### 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)

Flammable liquids	Category 2
Acute Inhalation Toxicity - Vapors	Category 4
Carcinogenicity	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 2
Aspiration Toxicity	Category 1

#### Label Elements

##### **Signal Word**

Danger

##### **Hazard Statements**

Highly flammable liquid and vapor  
May be fatal if swallowed and enters airways  
Harmful if inhaled  
May cause respiratory irritation  
May cause drowsiness or dizziness  
Suspected of causing 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  
Use only outdoors or in a well-ventilated area  
Do not breathe dust/fume/gas/mist/vapors/spray  
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

**Ingestion**

IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician

Do NOT induce vomiting

**Fire**

In case of fire: Use CO<sub>2</sub>, 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)**

Harmful to aquatic life with long lasting effects

**WARNING.** Cancer - <https://www.p65warnings.ca.gov/>.

### 3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Ethylbenzene	100-41-4	>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. Obtain medical attention.

<b>Inhalation</b>	Move to fresh air. If breathing is difficult, give oxygen. Obtain medical attention. Aspiration into lungs can produce severe lung damage.
<b>Ingestion</b>	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.
<b>Most important symptoms and effects</b>	Breathing difficulties. . Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting: May cause central nervous system depression
<b>Notes to Physician</b>	Treat symptomatically

## 5. Fire-fighting measures

<b>Suitable Extinguishing Media</b>	Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide. Cool closed containers exposed to fire with water spray.
<b>Unsuitable Extinguishing Media</b>	Do not use a solid water stream as it may scatter and spread fire
<b>Flash Point</b>	22 °C / 71 °F
<b>Method -</b>	No information available
<b>Autoignition Temperature</b>	432 °C / 810 °F
<b>Explosion Limits</b>	
<b>Upper</b>	6.8%
<b>Lower</b>	1.2%
<b>Sensitivity to Mechanical Impact</b>	No information available
<b>Sensitivity to Static Discharge</b>	Yes

### 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. Keep product and empty container away from heat and sources of ignition. Thermal decomposition can lead to release of irritating gases and vapors.

### Hazardous Combustion Products

Carbon monoxide (CO) Carbon dioxide (CO<sub>2</sub>)

### 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**  
3

**Flammability**  
3

**Instability**  
0

**Physical hazards**  
N/A

## 6. Accidental release measures

<b>Personal Precautions</b>	Use personal protective equipment. Ensure adequate ventilation. Remove all sources of ignition. Take precautionary measures against static discharges.
<b>Environmental Precautions</b>	Should not be released into the environment. Do not flush into surface water or sanitary sewer system. See Section 12 for additional ecological information. Collect spillage.
<b>Methods for Containment and Clean Up</b>	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

<b>Handling</b>	Wear personal protective equipment. 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
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precautionary measures against static discharges.

**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	Mexico OEL (TWA)
Ethylbenzene	TWA: 20 ppm	(Vacated) TWA: 100 ppm (Vacated) TWA: 435 mg/m <sup>3</sup> (Vacated) STEL: 125 ppm (Vacated) STEL: 545 mg/m <sup>3</sup> TWA: 100 ppm TWA: 435 mg/m <sup>3</sup>	IDLH: 800 ppm TWA: 100 ppm TWA: 435 mg/m <sup>3</sup> STEL: 125 ppm STEL: 545 mg/m <sup>3</sup>	TWA: 100 ppm TWA: 435 mg/m <sup>3</sup> STEL: 125 ppm STEL: 545 mg/m <sup>3</sup>

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. 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	aromatic
Odor Threshold	No information available
pH	No information available
Melting Point/Range	-95 °C / -139 °F
Boiling Point/Range	136 °C / 276.8 °F
Flash Point	22 °C / 71 °F
Evaporation Rate	No information available
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	6.8%
Lower	1.2%
Vapor Pressure	No information available
Vapor Density	No information available
Specific Gravity	0.860
Solubility	Slightly soluble in water
Partition coefficient; n-octanol/water	No data available

Autoignition Temperature	432 °C / 810 °F
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	C8 H10
Molecular Weight	106.17

## 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
Hazardous Decomposition Products	Carbon monoxide (CO), Carbon dioxide (CO <sub>2</sub> )
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
Ethylbenzene	3500 mg/kg ( Rat )	15400 mg/kg ( Rabbit )	17.2 mg/L ( 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	May cause eye, skin, and respiratory tract irritation
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
Ethylbenzene	100-41-4	Group 2B	Not listed	A3	X	Not listed

*IARC: (International Agency for Research on Cancer)*

*Group 2B - Possibly Carcinogenic to Humans*

*IARC: (International Agency for Research on Cancer)*

*Group 1 - Carcinogenic to Humans*

*Group 2A - Probably Carcinogenic to Humans*

*A1 - Known Human Carcinogen*

*A2 - Suspected Human Carcinogen*

*A3 - Animal Carcinogen*

*ACGIH: (American Conference of Governmental Industrial Hygienists)*

**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** No information available

**Symptoms / effects, both acute and delayed** Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting: May cause central nervous system depression

**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. The product contains following substances which are hazardous for the environment. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Ethylbenzene	EC50: 1.7 - 7.6 mg/L, 96h static (Pseudokirchneriella subcapitata) EC50: 2.6 - 11.3 mg/L, 72h static (Pseudokirchneriella subcapitata) EC50: > 438 mg/L, 96h (Pseudokirchneriella subcapitata) EC50: = 4.6 mg/L, 72h (Pseudokirchneriella subcapitata)	LC50: 11.0 - 18.0 mg/L, 96h static (Oncorhynchus mykiss) LC50: = 4.2 mg/L, 96h semi-static (Oncorhynchus mykiss) LC50: = 32 mg/L, 96h static (Lepomis macrochirus) LC50: 7.55 - 11 mg/L, 96h flow-through (Pimephales promelas) LC50: 9.1 - 15.6 mg/L, 96h static (Pimephales promelas) LC50: = 9.6 mg/L, 96h static (Poecilia reticulata)	EC50 = 9.68 mg/L 30 min EC50 = 96 mg/L 24 h	EC50: 1.8 - 2.4 mg/L, 48h (Daphnia magna)

**Persistence and Degradability** Insoluble 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 volatility.

Component	log Pow
Ethylbenzene	3.2

## 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 UN1175  
 Proper Shipping Name ETHYLBENZENE  
 Hazard Class 3  
 Packing Group II

### TDG

UN-No UN1175  
 Proper Shipping Name ETHYLBENZENE  
 Hazard Class 3  
 Packing Group II

### IATA



UN-No UN1175  
 Proper Shipping Name ETHYLBENZENE  
 Hazard Class 3  
 Packing Group II

**IMDG/IMO**

UN-No UN1175  
 Proper Shipping Name ETHYLBENZENE  
 Hazard Class 3  
 Packing Group II

**15. Regulatory information**

**All of the components in the product are on the following Inventory lists:** X = listed The product is classified and labeled according to EC directives or corresponding national laws The product is classified and labeled in accordance with Directive 1999/45/EC

**International Inventories**

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Ethylbenzene	X	X	-	202-849-4	-		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 %
Ethylbenzene	100-41-4	>95	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
Ethylbenzene	X	1000 lb	X	X

**Clean Air Act**

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Ethylbenzene	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
Ethylbenzene	1000 lb	-

**California Proposition 65** This product contains the following proposition 65 chemicals

Component	CAS-No	California Prop. 65	Prop 65 NSRL	Category
Ethylbenzene	100-41-4	Carcinogen	54 µg/day 41 µg/day	Carcinogen

**U.S. State Right-to-Know  
Regulations**

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Ethylbenzene	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** Serious risk, Grade 3

## 16. Other information

**Prepared By** Regulatory Affairs  
Thermo Fisher Scientific  
Email: EMSDS.RA@thermofisher.com

**Creation Date** 06-Aug-2010  
**Revision Date** 17-Jan-2018  
**Print Date** 17-Jan-2018  
**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

Creation Date 09-Feb-2016

Revision Date 18-Jan-2018

Revision Number 3

### 1. Identification

**Product Name** Fluorene

**Cat No. :** AC156130000; AC156130250; AC156131000; AC156135000

**CAS-No** 86-73-7  
**Synonyms** Diphenylenemethane

**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  
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)

Combustible dust	Yes
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**Label Elements**

**Signal Word**  
Warning

**Hazard Statements**  
May form combustible dust concentrations in air

**Precautionary Statements**

**Storage**  
Store in a well-ventilated place. Keep container tightly closed

**Hazards not otherwise classified (HNOC)**

Very toxic to aquatic life with long lasting effects

**3. Composition/Information on Ingredients**

Component	CAS-No	Weight %
Fluorene	86-73-7	>95

**4. First-aid measures**

<b>General Advice</b>	If symptoms persist, call a physician.
<b>Eye Contact</b>	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.
<b>Skin Contact</b>	Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.
<b>Inhalation</b>	Remove to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur.
<b>Ingestion</b>	Clean mouth with water and drink afterwards plenty of water. Get medical attention if symptoms occur.
<b>Most important symptoms and effects</b>	None reasonably foreseeable.
<b>Notes to Physician</b>	Treat symptomatically

**5. Fire-fighting measures**

<b>Suitable Extinguishing Media</b>	Water spray, carbon dioxide (CO2), dry chemical, alcohol-resistant foam.
<b>Unsuitable Extinguishing Media</b>	No information available
<b>Flash Point</b>	151 °C / 303.8 °F
<b>Method -</b>	No information available
<b>Autoignition Temperature</b>	Not applicable
<b>Explosion Limits</b>	
<b>Upper</b>	No data available
<b>Lower</b>	No data available
<b>Sensitivity to Mechanical Impact</b>	No information available
<b>Sensitivity to Static Discharge</b>	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**

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  
0Flammability  
1Instability  
0Physical hazards  
N/A

## 6. Accidental release measures

### Personal Precautions

Ensure adequate ventilation. Use personal protective equipment as required. 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.

### Methods for Containment and Clean Up

Sweep up and shovel into suitable containers for disposal. Keep in suitable, closed containers for disposal.

## 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. Avoid dust formation.

### Storage

Keep in a dry, cool and well-ventilated place. Refer product specification and/or product label for specific storage temperature requirement. Keep container tightly closed.

## 8. Exposure controls / personal protection

### Exposure Guidelines

This product does not contain any hazardous materials with occupational exposure limit 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

### Specific Gravity

1.200

<b>Solubility</b>	Insoluble in water
<b>Partition coefficient; n-octanol/water</b>	No data available
<b>Autoignition Temperature</b>	Not applicable
<b>Decomposition Temperature</b>	No information available
<b>Viscosity</b>	Not applicable
<b>Molecular Formula</b>	C13 H10
<b>Molecular Weight</b>	166.22

## 10. Stability and reactivity

<b>Reactive Hazard</b>	None known, based on information available
<b>Stability</b>	Stable under normal conditions.
<b>Conditions to Avoid</b>	Incompatible products.
<b>Incompatible Materials</b>	Strong oxidizing agents
<b>Hazardous Decomposition Products</b>	None under normal use conditions
<b>Hazardous Polymerization</b>	No information available.
<b>Hazardous Reactions</b>	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

<b>Irritation</b>	No information available
<b>Sensitization</b>	No information available
<b>Carcinogenicity</b>	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.

## 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
Fluorene	EC50 = 3.4 mg/L/96h	LC50 = 0.82 mg/L/96h	Not listed	Not listed

**Persistence and Degradability** 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

UN-No UN3077  
 Proper Shipping Name Environmentally hazardous substances, solid, n.o.s.  
 Technical Name Fluorene  
 Hazard Class 9  
 Packing Group III

### TDG

UN-No UN3077  
 Proper Shipping Name Environmentally hazardous substances, solid, n.o.s.  
 Hazard Class 9  
 Packing Group III

### IATA

UN-No UN3077  
 Proper Shipping Name Environmentally hazardous substances, solid, n.o.s.  
 Hazard Class 9  
 Packing Group III

### IMDG/IMO

UN-No UN3077  
 Proper Shipping Name Environmentally hazardous substances, solid, n.o.s.  
 Hazard Class 9  
 Packing Group III

## 15. Regulatory information

### United States of America Inventory

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
Fluorene	86-73-7	X	ACTIVE	-

### Legend:

**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/NDL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
Fluorene	86-73-7	X	-	201-695-5	X	X	X	X	98-3-1078

**U.S. Federal Regulations****SARA 313**

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Fluorene	86-73-7	>95	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
Fluorene	-	-	-	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.

**U.S. State Right-to-Know Regulations**

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

## 16. Other information

**Prepared By** Regulatory Affairs  
Thermo Fisher Scientific  
Email: EMSDS.RA@thermofisher.com

**Creation Date** 09-Feb-2016  
**Revision Date** 18-Jan-2018



**Print Date**

18-Jan-2018

**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

Creation Date 08-Nov-2010

Revision Date 16-Jan-2019

Revision Number 6

### 1. Identification

**Product Name** Fluoranthene

**Cat No. :** AC119170000; AC119170250; AC119171000; AC119175000

**CAS-No** 206-44-0  
**Synonyms** Benzo[j,k]fluorene

**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	Acros Organics
One Reagent Lane	One Reagent Lane
Fair Lawn, NJ 07410	Fair Lawn, NJ 07410
Tel: (201) 796-7100	

**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

<b>General Advice</b>	If symptoms persist, call a physician.
<b>Eye Contact</b>	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.
<b>Skin Contact</b>	Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.
<b>Inhalation</b>	Remove to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur.
<b>Ingestion</b>	Clean mouth with water and drink afterwards plenty of water. Get medical attention if symptoms occur.
<b>Most important symptoms and effects</b>	None reasonably foreseeable.
<b>Notes to Physician</b>	Treat symptomatically

### 5. Fire-fighting measures

<b>Suitable Extinguishing Media</b>	Water spray, carbon dioxide (CO <sub>2</sub> ), dry chemical, alcohol-resistant foam.
<b>Unsuitable Extinguishing Media</b>	No information available
<b>Flash Point</b>	Not applicable
<b>Method -</b>	No information available
<b>Autoignition Temperature</b>	No information available
<b>Explosion Limits</b>	No information available

<b>Upper</b>	No data available
<b>Lower</b>	No data available
<b>Sensitivity to Mechanical Impact</b>	No information available
<b>Sensitivity to Static Discharge</b>	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<sub>2</sub>).

**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**  
2

**Flammability**  
0

**Instability**  
0

**Physical hazards**  
N/A

## 6. Accidental release measures

<b>Personal Precautions</b>	Ensure adequate ventilation. Use personal protective equipment as required. Avoid dust formation.
<b>Environmental Precautions</b>	Should not be released into the environment.
<b>Methods for Containment and Clean Up</b>	Sweep up and shovel into suitable containers for disposal. Keep in suitable, closed containers for disposal.

## 7. Handling and storage

<b>Handling</b>	Ensure adequate ventilation. Wear personal protective equipment/face protection. Avoid dust formation. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation.
<b>Storage</b>	Keep in a dry, cool and well-ventilated place. Refer product specification and/or product label for specific storage temperature requirement. Keep container tightly closed.

## 8. Exposure controls / personal protection

<b>Exposure Guidelines</b>	This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.
<b>Engineering Measures</b>	Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.
<b>Personal Protective Equipment</b>	
<b>Eye/face Protection</b>	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.
<b>Skin and body protection</b>	Wear appropriate protective gloves and clothing to prevent skin exposure.
<b>Respiratory Protection</b>	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.
<b>Hygiene Measures</b>	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	Not applicable
Melting Point/Range	109 - 111 °C / 228.2 - 231.8 °F
Boiling Point/Range	384 °C / 723.2 °F
Flash Point	Not applicable
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
Specific Gravity	No information available
Solubility	insoluble
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 <sub>2</sub> )
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	LD50 = 2 g/kg ( Rat )	LD50 = 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

<b>Mutagenic Effects</b>	No information available
<b>Reproductive Effects</b>	No information available.
<b>Developmental Effects</b>	No information available.
<b>Teratogenicity</b>	No information available.
<b>STOT - single exposure</b>	None known
<b>STOT - repeated exposure</b>	None known
<b>Aspiration hazard</b>	No information available
<b>Symptoms / effects, both acute and delayed</b>	No information available
<b>Endocrine Disruptor Information</b>	No information available
<b>Other Adverse Effects</b>	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	5.1

## 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.

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 substances, solid, n.o.s.  
**Technical Name** Fluoranthene  
**Hazard Class** 9  
**Packing Group** III

### TDG

**UN-No** UN3077  
**Proper Shipping Name** Environmentally hazardous substances, solid, n.o.s.  
**Hazard Class** 9  
**Packing Group** III

### IATA

**UN-No** UN3077

<b>Proper Shipping Name</b>	Environmentally hazardous substances, solid, n.o.s.
<b>Hazard Class</b>	9
<b>Packing Group</b>	III
<b>IMDG/IMO</b>	
<b>UN-No</b>	UN3077
<b>Proper Shipping Name</b>	Environmentally hazardous substances, solid, n.o.s.
<b>Hazard Class</b>	9
<b>Packing Group</b>	III

## 15. Regulatory information

### United States of America Inventory

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
Fluoranthene	206-44-0	X	ACTIVE	-

#### Legend:

**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), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDSL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
Fluoranthene	206-44-0	-	X	205-912-4	-	X	X	X	-

### U.S. Federal Regulations

#### SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Fluoranthene	206-44-0	>95	1.0 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
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.

### U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
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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

**16. Other information**

**Prepared By** Regulatory Affairs  
Thermo Fisher Scientific  
Email: EMSDS.RA@thermofisher.com

**Creation Date** 08-Nov-2010

**Revision Date** 16-Jan-2019

**Print Date** 16-Jan-2019

**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**





# AccuStandard<sup>®</sup>, 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: H-157N

Description: Indeno(1,2,3-cd)pyrene

CAS No.: 193-39-5

#### 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

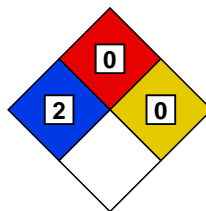
Email: edocs@accustandard.com

#### 1.4 - Emergency Telephone Number

Emergency Phone #: AccuStandard, Inc.  
1-203-786-5290  
Hours: Monday to Friday 8:00am to 5:00pm EST

### SECTION 2 - HAZARDS IDENTIFICATION

#### 2.1 - GHS Label Elements



*	2	HEALTH
0		FLAMMABILITY
0		PHYSICAL HAZARD

**Signal Word: Danger**

#### Hazard Codes:

H302 - Harmful if swallowed. (Acute toxicity, oral, category 4)

H332 - Harmful if inhaled. (Acute toxicity, inhalation, category 4)

H335 - May be irritating to mucous membrane and upper respiratory system. (Specific target organ toxicity, single exposure; Respiratory tract irritation, category 3)

H350 - This product is or contains a component that is classified (ACGIH, IARC, NTP, OSHA) as a possible cancer hazard. (Carcinogenicity, category 1B)

#### Precautionary Codes:

P202 - This product should only be used by persons trained in the safe handling of hazardous chemicals.

P235 - Store in a cool dry place.

P260 - Do not breathe dust.

P262 - Do not get in eyes, on skin or clothing.

**SECTION 2 - HAZARDS IDENTIFICATION** - continued**2.1 - GHS Label Elements** - continued

P264 - Wash thoroughly after handling. Do not take internally. Eye wash and safety equipment should be readily available.

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.

P310 - Ingestion: Call a physician or poison control center immediately. If conscious, give water freely.

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.

P404 - Store in a tightly closed container.

**2.2 - Other Hazards****2.2.1 - Symptom of Exposure Health/Environment**

Harmful.

Environmental hazard.

**2.2.2 - Potential Health Effects**

May be irritating to eyes.

May be irritating to skin.

May be harmful if absorbed through the skin. (Acute toxicity, dermal, category 5)

May be irritating to mucous membrane and upper respiratory system. (Specific target organ toxicity, single exposure; Respiratory tract irritation, category 3)

Harmful if inhaled. (Acute toxicity, inhalation, category 4)

Harmful if swallowed. (Acute toxicity, oral, category 4)

**2.2.3 - Routes of Entry**

Inhalation, ingestion or skin contact.

**2.2.4 - Carcinogenicity**

California Proposition 65 cancer hazard.

This product is or contains a component that is classified (ACGIH, IARC, NTP, OSHA) as a possible cancer hazard. (Carcinogenicity, category 1B)

**SECTION 3 - COMPOSITION / ANALYTES DATA**

Description: Indeno(1,2,3-cd)pyrene

Synonyms: o-Phenylene pyrene; IP; 2,3-Phenylene pyrene

Molecular Weight: 276.34

Molecular Formula: C22H12

EC#: 205-893-2

Analyte	CAS Number	% Concentration	ACGIH -TLV (mg/m <sup>3</sup> )			OSHA -PEL (mg/m <sup>3</sup> )		
			TWA	STEL	Skin	TWA	STEL	Skin
Indeno(1,2,3-cd)pyrene	193-39-5	100.000						

**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: Call a physician or poison control center immediately. If conscious, give water freely. (P310)

**SECTION 5 - FIRE FIGHTING MEASURES****5.1 - Flammable Properties**

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 a self-contained breathing apparatus and appropriate Personal protection. Prevent contact with skin or eyes. Ventilate area. Avoid raising dust. Take up and containerize for proper disposal. Flush spill area with water. Comply with Federal, State, and local regulations.

**SECTION 7 - HANDLING AND STORAGE**

Store in a tightly closed container. (P404)

Store in a cool dry place. (P235)

Use with adequate ventilation.

Do not breathe dust. (P260)

Do not get in eyes, on skin or clothing. (P262)

Avoid prolonged or repeated exposure.

This product should only be 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)

**SECTION 8 - EXPOSURE CONTROLS** - continued**8.2 - General Hygiene 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.

Compatible chemical-resistant protective gloves must be worn to prevent skin contact. Inspect gloves prior to use. Use proper glove removal technique to avoid contact with product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash hands thoroughly and dry.

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: Solid

Odor: N/A

Odor Threshold: N/A

pH: N/A

Melting Point: 150 - 153 °C

Boiling Point: 497 - 498 °C

Flash Point: 477 °F / 247 °C

Evaporation Rate (Butyl Acetate=1): N/A

Flammability Class: N/A

Lower Flammability Level: N/A

Upper Flammability Level: N/A

Vapor Pressure: N/A

Vapor Density (Air = 1): N/A

Specific Gravity: 1.38 g/cm<sup>3</sup>

Solubility in Water: Insoluble

Partition Coefficient: log Pow: 6.58

Autoignition Temperature: N/A

Decomposition Temperature: N/A

Viscosity: N/A

VOC Content: N/A

Percent Volatile: N/A

**SECTION 10 - STABILITY AND REACTIVITY**

Stability: Stable

Materials to Avoid: Oxidizers

Hazardous Decomposition: Oxides of carbon

**SECTION 10 - STABILITY AND REACTIVITY** - continued

Hazardous Polymerization: Will not occur

Condition to Avoid: Excessive heat

**SECTION 11 - TOXICOLOGICAL INFORMATION****Human Health Toxicity**

See section 2 for specific toxicological information for the ingredients of this product.

LD50 (Oral): N/A

LD50 (Dermal) : N/A

LC50 (Inhalation): N/A

As a class of compounds, PAHs are considered to be harmful to human health.

WARNING: This product contains chemical(s) known to the state of California to cause cancer.

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): N/A

EC50 (Aquatic Invertebrate): N/A

BCF: N/A

As a class of compounds, PAHs are considered to be harmful to the environment.

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)

UN Number: NR

Class: NR

Packing Group: NR

Proper Shipping Name: Not Regulated for Transport

Poison by Inhalation: No

Marine Pollutant: No

**SECTION 15 - REGULATORY INFORMATION**

WARNING: This product contains chemical(s) known to the state of California to cause cancer.

This product is subject to SARA section 313 reporting requirements.

The CAS number of this product is 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 (SDS)

### SECTION 1 — CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Lead

**Signal Word**  
**DANGER**

Flinn Scientific, Inc. P.O. Box 219, Batavia, IL 60510 (800) 452-1261

Chemtrec Emergency Phone Number: (800) 424-9908

**Pictograms**

### SECTION 2 — HAZARDS IDENTIFICATION

Hazard class: Acute toxicity, oral and inhalation (Category 4). Harmful if swallowed or inhaled (H302+H332). Do not eat, drink or smoke when using this product (P270). Avoid breathing dust and fumes (P261).



Hazard class: Carcinogenicity (Category 2). Suspected of causing cancer (H351). Obtain special instructions before use (P201). Do not handle until all safety precautions have been read and understood (P202). Use personal protective equipment as required (P281). Elemental lead is a possible human carcinogen (IARC-2B).



Hazard class: Reproductive toxicity (Category 1A). May damage fertility or the unborn child (H360).

Hazard class: Specific target organ toxicity, repeated exposure (Category 2). May cause damage to organs through prolonged or repeated exposure (H373). Do not eat, drink or smoke when using this product (P270).

### SECTION 3 — COMPOSITION, INFORMATION ON INGREDIENTS

Component Name	CAS Number	Formula	Formula Weight	Concentration
Lead Forms: foil, sheets, shot, strips, and wire.	7439-92-1	Pb	207.19	

### SECTION 4 — FIRST AID MEASURES

**If exposed or concerned:** Get medical advice or attention (P308+P313).

**If inhaled:** Remove victim to fresh air and keep at rest in a position comfortable for breathing (P304+P340).

**If in eyes:** Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do so. Continue rinsing.

**If on skin:** Wash with plenty of water.

**If swallowed:** Rinse mouth. Immediately call a POISON CENTER or physician (P301+P310+P330).

### SECTION 5 — FIRE FIGHTING MEASURES

Finely divided lead dust is flammable.

Molten metal may release toxic fumes of lead.

In case of fire: Use a tri-class dry chemical fire extinguisher.

**NFPA Code**  
None established

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## SECTION 6 — ACCIDENTAL RELEASE MEASURES

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Sweep up, place in sealed bag or container and dispose. Ventilate area and wash spill site after material pickup is complete. See Sections 8 and 13 for further information.

---

## SECTION 7 — HANDLING AND STORAGE

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Flinn Suggested Chemical Storage Pattern: Inorganic #1. Store with metals and metal hydrides.  
Use fume hood when handling powder form.

---

## SECTION 8 — EXPOSURE CONTROLS, PERSONAL PROTECTION

---

Wear protective gloves, protective clothing, and eye protection. Wash hands thoroughly after handling. Use fume hood when handling powder form.

Exposure guidelines: PEL/TLV 0.05 mg/m<sup>3</sup> (OSHA/ACGIH)

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## SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

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Heavy, ductile, gray solid. Odorless.	Boiling point: 1740 °C
Soluble: Dilute nitric acid. Insoluble in water.	Melting point: 327.4 °C
Lead wire also contains 1% antimony (CAS #7440-36-0)	Specific gravity: 11.35

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## SECTION 10 — STABILITY AND REACTIVITY

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Avoid strong acids, ammonium nitrate, hydrogen peroxide, sodium azide, zirconium, sodium acetylide, and chlorine.  
Shelf life: Indefinite, if stored properly.

---

## SECTION 11 — TOXICOLOGICAL INFORMATION

---

Acute effects: Convulsions, seizures, weakness, muscle cramps, methemoglobinemia.	ORL-Pigeon LD <sub>50</sub> : 160 mg/kg SKN-RBT LD <sub>50</sub> : N.A. IHL-Human LCL <sub>0</sub> : 10 ug/m <sup>3</sup>
Chronic effects: Anemia, reproductive hazard, possible carcinogen.	Lead is an IARC Category 2B; Possibly carcinogenic to humans. Lead is classified by NTP as Reasonably
Target organs: Nerves, brain, blood, kidneys, female/male reproductive system	Anticipated to be a Human Carcinogen

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## SECTION 12 — ECOLOGICAL INFORMATION

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Accumulates in soil and water. Bioaccumulates in animals. Very toxic to aquatic life with long lasting effects

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## SECTION 13 — DISPOSAL CONSIDERATIONS

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Please review all federal, state and local regulations that may apply before proceeding.  
Flinn Suggested Disposal Method #27d is one option.

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## SECTION 14 — TRANSPORT INFORMATION

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Shipping name: Not regulated. Hazard class: N/A. UN number: N/A.

---

## SECTION 15 — REGULATORY INFORMATION

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TSCA-listed, EINECS-listed (231-100-4), RCRA code D008.

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## SECTION 16 — OTHER INFORMATION

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This Safety Data Sheet (SDS) is for guidance and is based upon information and tests believed to be reliable. Flinn Scientific, Inc. makes no guarantee of the accuracy or completeness of the data and shall not be liable for any damages relating thereto. The data is offered solely for your consideration, investigation, and verification. The data should not be confused with local, state, federal or insurance mandates, regulations, or requirements and CONSTITUTE NO WARRANTY. Any use of this data and information must be determined by the science instructor to be in accordance with applicable local, state or federal laws and regulations. The conditions or methods of handling, storage, use and disposal of the product(s) described are beyond the control of Flinn Scientific, Inc. and may be beyond our knowledge. FOR THIS AND OTHER REASONS, WE DO NOT ASSUME RESPONSIBILITY AND EXPRESSLY DISCLAIM LIABILITY FOR LOSS, DAMAGE OR



EXPENSE ARISING OUT OF OR IN ANY WAY CONNECTED WITH THE HANDLING, STORAGE, USE OR DISPOSAL OF THIS PRODUCT(S).

N.A. = Not available, not all health aspects of this substance have been fully investigated.

N/A = Not applicable

**Consult your copy of the Flinn Science Catalog/Reference Manual for additional information about laboratory chemicals.**

**Revision Date:** January 26, 2016

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## SAFETY DATA SHEET

Creation Date 20-Aug-2014

Revision Date 17-Jan-2018

Revision Number 3

### 1. Identification

**Product Name** Mercury (Certified ACS)

**Cat No. :** M141-1LB; M141-6LB

**Synonyms** Colloidal mercury; Hydrargyrum; Metallic mercury

**Recommended Use** Laboratory chemicals.

**Uses advised against** Not for food, drug, pesticide or biocidal product use

#### 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)

Corrosive to metals	Category 1
Acute Inhalation Toxicity - Vapors	Category 2
Reproductive Toxicity	Category 1B
Specific target organ toxicity - (repeated exposure)	Category 1
Target Organs - Central nervous system (CNS), Kidney.	

#### Label Elements

##### **Signal Word**

Danger

##### **Hazard Statements**

May be corrosive to metals

Fatal if inhaled

May damage 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  
Do not get in eyes, on skin, or on clothing  
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  
Wear respiratory protection

**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**

Immediately call a POISON CENTER or doctor/physician  
IF ON SKIN: Gently wash with plenty of soap and water  
Remove/Take off immediately all contaminated clothing  
Wash contaminated clothing before reuse

**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.** Reproductive Harm - <https://www.p65warnings.ca.gov/>.

### 3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Mercury	7439-97-6	100

### 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 soap and plenty of water while removing all contaminated clothes and shoes. Immediate medical attention is required.

**Inhalation**

Move 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. Immediate medical attention is required.

**Ingestion**

Do not induce vomiting. Call a physician or Poison Control Center immediately.

<b>Most important symptoms and effects</b>	No information available.
<b>Notes to Physician</b>	Treat symptomatically

## 5. Fire-fighting measures

<b>Suitable Extinguishing Media</b>	Substance is nonflammable; use agent most appropriate to extinguish surrounding fire.
<b>Unsuitable Extinguishing Media</b>	No information available
<b>Flash Point</b>	No information available
<b>Method -</b>	No information available
<b>Autoignition Temperature</b>	No information available
<b>Explosion Limits</b>	
<b>Upper</b>	No data available
<b>Lower</b>	No data available
<b>Sensitivity to Mechanical Impact</b>	No information available
<b>Sensitivity to Static Discharge</b>	No information available

### Specific Hazards Arising from the Chemical

Very toxic. Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes. Keep product and empty container away from heat and sources of ignition.

### Hazardous Combustion Products

Mercury oxide Highly 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.

### NFPA

<b>Health</b>	<b>Flammability</b>	<b>Instability</b>	<b>Physical hazards</b>
4	0	0	N/A

## 6. Accidental release measures

<b>Personal Precautions</b>	Wear self-contained breathing apparatus and protective suit. Evacuate personnel to safe areas. Ensure adequate ventilation. Do not get in eyes, on skin, or on clothing.
<b>Environmental Precautions</b>	Should not be released into the environment. See Section 12 for additional ecological information.
<b>Methods for Containment and Clean Up</b>	Wear self-contained breathing apparatus and protective suit. Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

## 7. Handling and storage

<b>Handling</b>	Use only under a chemical fume hood. Wear personal protective equipment. Do not get in eyes, on skin, or on clothing. Do not breathe vapors or spray mist. Do not ingest.
<b>Storage</b>	Keep containers tightly closed in a dry, cool and well-ventilated place. Corrosives area.

## 8. Exposure controls / personal protection

### Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Mercury	TWA: 0.025 mg/m <sup>3</sup> Skin	(Vacated) TWA: 0.05 mg/m <sup>3</sup> Ceiling: 0.1 mg/m <sup>3</sup> (Vacated) STEL: 0.03 mg/m <sup>3</sup> Skin (Vacated) Ceiling: 0.1 mg/m <sup>3</sup>	IDLH: 10 mg/m <sup>3</sup> TWA: 0.05 mg/m <sup>3</sup> Ceiling: 0.1 mg/m <sup>3</sup>	TWA: 0.05 mg/m <sup>3</sup>

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 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	Liquid
Appearance	Silver
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	-38.87 °C / -38 °F
Boiling Point/Range	356.72 °C / 674.1 °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	0.002 mmHg @ 25 °C
Vapor Density	7.0
Specific Gravity	13.59 (H <sub>2</sub> O=1)
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	Hg
Molecular Weight	200.59

## 10. Stability and reactivity

<b>Reactive Hazard</b>	None known, based on information available
<b>Stability</b>	Stable under normal conditions.
<b>Conditions to Avoid</b>	Incompatible products. Excess heat.
<b>Incompatible Materials</b>	Strong oxidizing agents, Ammonia, Metals, Halogens

**Hazardous Decomposition Products** Mercury oxide, Highly toxic fumes

**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 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
Mercury	7439-97-6	Not listed	Not listed	Not listed	Not listed	Not listed

**Mutagenic Effects** No information available

**Reproductive Effects** No information available.

**Developmental Effects** May cause harm to the unborn child.

**Teratogenicity** No information available.

**STOT - single exposure** None known

**STOT - repeated exposure** Central nervous system (CNS) Kidney

**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

This product contains the following substance(s) which are hazardous for the environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Mercury	Not listed	0.9 mg/L LC50 96h 0.18 mg/L LC50 96h 0.16 mg/L LC50 96h 0.5 mg/L LC50 96h	Not listed	EC50: = 5.0 µg/L, 96h (water flea)

**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.

Component	RCRA - U Series Wastes	RCRA - P Series Wastes
Mercury - 7439-97-6	U151	-

## 14. Transport information

**DOT**

UN-No	UN2809
Proper Shipping Name	MERCURY
Hazard Class	8
Subsidiary Hazard Class	6.1
Packing Group	III

**TDG**

UN-No	UN2809
Proper Shipping Name	MERCURY
Hazard Class	8
Subsidiary Hazard Class	6.1
Packing Group	III

**IATA**

UN-No	UN2809
Proper Shipping Name	MERCURY
Hazard Class	8
Subsidiary Hazard Class	6.1
Packing Group	III

**IMDG/IMO**

UN-No	UN2809
Proper Shipping Name	MERCURY
Hazard Class	8
Subsidiary Hazard Class	6.1
Packing Group	III

## 15. Regulatory information

**International Inventories**

Component	TSCA	DSL	NDL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Mercury	X	X	-	231-106-7	-		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)
Mercury	Section 5

**SARA 313**

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Mercury	7439-97-6	100	1.0

**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
Mercury	-	-	X	X

**Clean Air Act**

Component	HAPS Data	Class 1 Ozone Depleters	Class 2 Ozone Depleters
Mercury	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
Mercury	1 lb	-

**California Proposition 65** This product contains the following proposition 65 chemicals

Component	CAS-No	California Prop. 65	Prop 65 NSRL	Category
Mercury	7439-97-6	Developmental	-	Developmental

**U.S. State Right-to-Know Regulations**

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Mercury	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

## 16. Other information

**Prepared By** Regulatory Affairs  
Thermo Fisher Scientific  
Email: EMSDS.RA@thermofisher.com

**Creation Date** 20-Aug-2014  
**Revision Date** 17-Jan-2018  
**Print Date** 17-Jan-2018  
**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

Creation Date 26-Sep-2009

Revision Date 06-Feb-2020

Revision Number 5

### 1. Identification

**Product Name** m-Xylene

**Cat No. :** AC610470000; AC610471000

**CAS-No** 108-38-3  
**Synonyms** 1,3-Dimethylbenzene

**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  
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
Acute dermal toxicity	Category 4
Acute Inhalation Toxicity - Vapors	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.	
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  
Harmful in contact with skin or if inhaled  
May cause respiratory irritation



### Precautionary Statements

#### Prevention

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  
Wash face, hands and any exposed skin thoroughly after handling  
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

#### 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

Call a POISON CENTER or doctor/physician if you feel unwell  
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 CO<sub>2</sub>, dry chemical, or foam for extinction

#### Storage

Store locked up  
Store in a well-ventilated place. Keep cool

#### 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 %
m-Xylene	108-38-3	>95

### 4. First-aid measures

<b>General Advice</b>	If symptoms persist, call a physician.
<b>Eye Contact</b>	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.
<b>Skin Contact</b>	Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.
<b>Inhalation</b>	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).
<b>Ingestion</b>	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.
<b>Most important symptoms and effects</b>	None reasonably foreseeable. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting
<b>Notes to Physician</b>	Treat symptomatically

## 5. Fire-fighting measures

<b>Suitable Extinguishing Media</b>	Water spray, carbon dioxide (CO <sub>2</sub> ), dry chemical, alcohol-resistant foam. Water mist may be used to cool closed containers.
<b>Unsuitable Extinguishing Media</b>	No information available
<b>Flash Point</b>	25 °C / 77 °F
<b>Method -</b>	No information available
<b>Autoignition Temperature</b>	465 °C / 869 °F
<b>Explosion Limits</b>	
<b>Upper</b>	7.0%
<b>Lower</b>	1.1%
<b>Sensitivity to Mechanical Impact</b>	No information available
<b>Sensitivity to Static Discharge</b>	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<sub>2</sub>).

### 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**  
3

**Flammability**  
3

**Instability**  
0

**Physical hazards**  
N/A

## 6. Accidental release measures

<b>Personal Precautions</b>	Use personal protective equipment as required. Ensure adequate ventilation. Remove all sources of ignition. Take precautionary measures against static discharges.
<b>Environmental Precautions</b>	Do not flush into surface water or sanitary sewer system.
<b>Methods for Containment and Clean</b>	Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

**Up** 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. 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.

## 8. Exposure controls / personal protection

### Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
m-Xylene	TWA: 100 ppm STEL: 150 ppm		IDLH: 900 ppm TWA: 100 ppm TWA: 435 mg/m <sup>3</sup> STEL: 150 ppm STEL: 655 mg/m <sup>3</sup>	TWA: 100 ppm STEL: 150 ppm

### Legend

ACGIH - American Conference of Governmental Industrial Hygienists

NIOSH IDLH: NIOSH - National Institute for Occupational Safety and Health

**Engineering Measures** Ensure that eyewash stations and safety showers are close to the workstation location. Ensure adequate ventilation, especially in confined areas. 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

<b>Physical State</b>	Liquid
<b>Appearance</b>	Colorless
<b>Odor</b>	aromatic
<b>Odor Threshold</b>	No information available
<b>pH</b>	No information available
<b>Melting Point/Range</b>	-48 °C / -54.4 °F
<b>Boiling Point/Range</b>	139 - 139 °C / 282.2 - 282.2 °F
<b>Flash Point</b>	25 °C / 77 °F
<b>Evaporation Rate</b>	0.7
<b>Flammability (solid,gas)</b>	Not applicable
<b>Flammability or explosive limits</b>	
Upper	7.0%
Lower	1.1%

Vapor Pressure	8 mbar @ 20 °C
Vapor Density	3.66
Specific Gravity	0.864
Solubility	Slightly soluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	465 °C / 869 °F
Decomposition Temperature	No information available
Viscosity	0.62 mPa.s at 20 °C
Molecular Formula	C8 H10
Molecular Weight	106.17

## 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 acids
Hazardous Decomposition Products	Carbon monoxide (CO), Carbon dioxide (CO <sub>2</sub> )
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
m-Xylene	LD50 = 5 g/kg ( Rat )	LD50 = 12.18 g/kg ( Rabbit ) LD50 = 14100 µL/kg ( Rabbit )	LC50 = 5984 ppm ( Rat ) 6 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 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
m-Xylene	108-38-3	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** 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

The product contains following substances which are hazardous for the environment. Contains a substance which is: Toxic to aquatic organisms.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
m-Xylene	EC50: = 4.9 mg/L, 72h static (Pseudokirchneriella subcapitata)	LC50: = 12.9 mg/L, 96h semi-static (Poecilia reticulata) LC50: = 8.4 mg/L, 96h semi-static (Oncorhynchus mykiss) LC50: 14.3 - 18 mg/L, 96h flow-through (Pimephales promelas)	EC50 = 0.0084 mg/L 24 h	EC50: 2.81 - 5.0 mg/L, 48h Static (Daphnia magna)

**Persistence and Degradability** Persistence is unlikely

**Bioaccumulation/ Accumulation** No information available.

**Mobility** Will likely be mobile in the environment due to its volatility. Is not likely mobile in the environment due its low water solubility.

Component	log Pow
m-Xylene	3.2

## 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 UN1307  
 Proper Shipping Name XYLENES  
 Hazard Class 3  
 Packing Group III

### TDG

UN-No UN1307  
 Proper Shipping Name XYLENES  
 Hazard Class 3  
 Packing Group III

### IATA

UN-No UN1307  
 Proper Shipping Name XYLENES  
 Hazard Class 3  
 Packing Group III

### IMDG/IMO

UN-No UN1307  
 Proper Shipping Name XYLENES  
 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
m-Xylene	108-38-3	X	ACTIVE	-

**Legend:**

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/NDL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
m-Xylene	108-38-3	X	-	203-576-3	X	X	X	X	KE-35428

U.S. Federal Regulations**SARA 313**

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
m-Xylene	108-38-3	>95	1.0

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
m-Xylene	X	-	-	-

**Clean Air Act**

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
m-Xylene	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
m-Xylene	1000 lb	-

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
m-Xylene	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

## 16. Other information

**Prepared By** Regulatory Affairs  
Thermo Fisher Scientific  
Email: EMSDS.RA@thermofisher.com

**Creation Date** 26-Sep-2009

**Revision Date** 06-Feb-2020

**Print Date** 06-Feb-2020

**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

Material Name: NAPHTHALENE

SDS ID: 00228306

### Section 1 - PRODUCT AND COMPANY IDENTIFICATION

**Material Name**

NAPHTHALENE

**Synonyms**

NAPHTHALENE CRUDE 78 DEGREE; NAPHTHALENE INTERMEDIATE 79 DEGREE; NAPHTHALENE REFINED 80 DEGREE; COAL TAR NAPHTHALENE

**Chemical Family**

polynuclear aromatic hydrocarbons

**Product Use**

Intermediate process chemical.

**Restrictions on Use**

None known.

**Details of the supplier of the safety data sheet**

KOPPERS INC.

436 Seventh Avenue

Pittsburgh, PA 15219-1800

Mfg Contact: 412-227-2001 (SDS Requests: 866-852-5239)

CHEMTREC: 800-424-9300 (Outside USA: +1 703-527-3887)

Emergencies: (Medical in USA): 877-737-9047

Emergencies: (Medical Outside of USA): 651-632-9269

E-mail: naorgmsds@koppers.com

### Section 2 - HAZARDS IDENTIFICATION

**Classification in accordance with paragraph (d) of 29 CFR 1910.1200.**

Flammable Liquids - Category 4

Acute Toxicity - Oral - Category 4

Acute Toxicity - Dermal - Category 4

Skin Corrosion/Irritation - Category 2

Serious Eye Damage/Eye Irritation - Category 2A

Skin Sensitization - Category 1A

Germ Cell Mutagenicity - Category 2

Carcinogenicity - Category 1B

Specific Target Organ Toxicity - Single Exposure - Category 1 ( blood , eyes , respiratory system , Hematopoietic System , Cardiovascular system , Central Nervous System , kidneys , liver )

Specific Target Organ Toxicity - Repeated Exposure - Category 1 ( Hematopoietic System , Cardiovascular system , Central Nervous System , respiratory system , liver , kidneys , bone marrow )

Specific Target Organ Toxicity - Repeated Exposure - Category 2 ( lungs , liver )

Hazardous to the Aquatic Environment - Acute - Category 1

Hazardous to the Aquatic Environment - Chronic - Category 1

**GHS Label Elements**

**Symbol(s)**

## Safety Data Sheet

**Material Name: NAPHTHALENE**

**SDS ID: 00228306**



### Signal Word

Danger

### Hazard Statement(s)

Combustible liquid.

Harmful if swallowed.

Harmful in contact with skin.

Causes skin irritation.

Causes serious eye irritation.

May cause an allergic skin reaction.

Suspected of causing genetic defects.

May cause cancer.

Causes damage to organs.

Causes damage to organs through prolonged or repeated exposure.

May cause damage to organs through prolonged or repeated exposure.

Very toxic to aquatic life with long lasting effects.

### Precautionary Statement(s)

#### Prevention

Obtain special instructions before use.

Do not handle until all safety precautions have been read and understood.

Keep away from heat/sparks/open flame/hot surfaces - No smoking.

Wear protective gloves/protective clothing/eye protection/face protection.

Do not breathe dust/fume/gas/mist/vapors/spray.

Wash thoroughly after handling.

Contaminated work clothing must not be allowed out of the workplace.

Do not eat, drink or smoke when using this product.

Avoid release to the environment.

Wear protective gloves.

#### Response

In case of fire: Use appropriate media to extinguish.

Collect spillage.

If exposed: 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.

IF ON SKIN: Wash with plenty of soap and water.

If skin irritation or rash occurs: Get medical advice/attention.

Take off contaminated clothing and wash before reuse.

Rinse mouth.

Call a POISON CENTER or doctor if you feel unwell.

Specific treatment (see label).

#### Storage

Store in a well-ventilated place. Keep cool.

Store locked up.



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### Disposal

Dispose of contents/container in accordance with local/regional/national/international regulations.

### Other Hazards

Heated material may cause thermal burns.

## Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

CAS	Component Name	Percent
91-20-3	Naphthalene	94.5-100
95-15-8	Benzo[b]thiophene	1.6-1.9
91-22-5	Quinoline	1.6-1.9
91-57-6	2-Methylnaphthalene	0.1-1.6
1319-77-3	Cresol	0.2-1.2
90-12-0	1-Methylnaphthalene	0.1-0.6
108-68-9	3,5-Xylenol	0.3-0.4
95-13-6	Indene	0.1-0.3

## 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 or use a waterless handcleaner while removing contaminated clothing and shoes. For thermal burns, cool affected areas as quickly as possible by drenching or immersing in water until material solidifies. Get immediate medical attention.

### Eyes

Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Then get immediate medical attention.

### Ingestion

Not a likely route of exposure. If burns occur, treat as thermal burns. Do NOT induce vomiting. If a large amount is swallowed, get medical attention. Do not give anything by mouth to unconscious or convulsive person. If vomiting occurs, keep head lower than hips to help prevent aspiration. Rinse mouth.

### Most Important Symptoms/Effects

#### Acute

Harmful if swallowed Harmful in contact with skin. Causes skin irritation. Causes serious eye irritation. May cause allergic skin reaction. Causes damage to organs.

#### Delayed

Suspected of causing genetic defects. May cause cancer. Causes damage to organs through prolonged or repeated exposure. May cause damage to organs through prolonged or repeated exposure.

**Indication of any immediate medical attention and special treatment needed**



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Treat symptomatically and supportively.

### Section 5 - FIRE FIGHTING MEASURES

#### Extinguishing Media

##### Suitable Extinguishing Media

regular dry chemical, carbon dioxide, dry sand, earth, water spray, regular foam, Large fires: Use water spray, fog or regular foam.

##### Unsuitable Extinguishing Media

Do not use water jets.

#### Special Hazards Arising from the Chemical

Moderate 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.

#### 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. Directly spraying water or foam onto hot burning product may cause frothing. For fires in cargo or storage area: Cool containers with water from unmanned hose holder or monitor nozzles until well after fire is out. Keep unnecessary people away, isolate hazard area and deny entry. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire.

#### 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

Avoid inhalation or contact. Provide adequate ventilation. Wear personal protective clothing and equipment, see Section 8. Avoid release to the environment. Collect spillage.

#### Methods and Materials for Containment and Cleaning Up

Eliminate all ignition sources if safe to do so. Do not touch or walk through spilled material. Stop leak if possible without personal risk. Small spills: Absorb with sand or other non-combustible material. Collect spilled material in appropriate container for disposal. Large spills: Dike for later disposal. Prevent entry into waterways, sewers, basements, or confined areas. In Canada, report releases to provincial authorities, municipal authorities, or both, as required. If this product is spilled or leaked into the environment, the CERCLA (40 CFR 302.4) reportable quantity is 100 pounds, and requires National Response Center notification.

### Section 7 - HANDLING AND STORAGE

#### Precautions for Safe Handling

Keep away from flames and hot surfaces. No smoking. Do not breathe vapor or mist. Avoid breathing vapors of heated materials. Avoid contact with eyes, skin and clothing. Use only in well ventilated area. Wash exposed areas thoroughly with soap and water, or a waterless handcleaner, after skin contact and before eating, drinking, using tobacco products, or restrooms. Contaminated clothing should be removed and laundered before reuse. Wear protective gloves/clothing and eye/face protection. Do not eat, drink, or smoke when using this product. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood.

#### Conditions for Safe Storage, Including any Incompatibilities



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Store in a well-ventilated place. Keep cool.

Store locked up.

Store and handle in accordance with all current regulations and standards. Label all containers. Keep away from heat, sparks and naked flames. Store in a cool, dry place. Protect from physical damage. Keep separated from incompatible substances.

**Incompatible Materials**

oxidizing materials

### Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

#### Component Exposure Limits

<b>Naphthalene</b>	<b>91-20-3</b>
ACGIH:	10 ppm TWA
	Skin - potential significant contribution to overall exposure by the cutaneous route
OSHA (US):	10 ppm TWA ; 50 mg/m <sup>3</sup> TWA
Mexico:	Skin - potential for cutaneous absorption
<b>2-Methylnaphthalene</b>	<b>91-57-6</b>
Mexico:	0.5 ppm TWA [VLE-PPT ]
	Skin - potential for cutaneous absorption
<b>1-Methylnaphthalene</b>	<b>90-12-0</b>
Mexico:	0.5 ppm TWA [VLE-PPT ]
	Skin - potential for cutaneous absorption
<b>3,5-Xylenol</b>	<b>108-68-9</b>
ACGIH:	1 ppm TWA inhalable fraction and vapor
<b>Indene</b>	<b>95-13-6</b>
ACGIH:	5 ppm TWA
NIOSH:	10 ppm TWA ; 45 mg/m <sup>3</sup> TWA
Mexico:	5 ppm TWA [VLE-PPT ]

#### ACGIH - Threshold Limit Values - Biological Exposure Indices (BEI)

##### Naphthalene (91-20-3)

Time: end of shift Parameter: 1-Naphthol with hydrolysis plus 2-Naphthol with hydrolysis (nonquantitative, nonspecific )

#### Engineering Controls



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Ensure adequate ventilation. Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Ensure compliance with applicable exposure limits.

### Individual Protection Measures, such as Personal Protective Equipment

#### Eye/face protection

ANSI Z87.1-1989 approved safety glasses with side shields. Provide an emergency eye wash fountain and quick drench shower in the immediate work area. For the molten form: A face shield is recommended.

#### Skin Protection

Wear protective clothing to prevent contact. Contaminated clothing should be removed and laundered before reuse. In the molten form: Wear appropriate heat resistant clothing.

#### Respiratory Protection

If the applicable TLVs and/or PELs are exceeded, use canister or cartridge respirators, which are MSHA/NIOSH-approved, with organic vapor cartridges and high-efficiency particulate filters.

#### Glove Recommendations

Wear appropriate gloves. In the molten form: Wear appropriate heat resistant gloves.

#### Protective Materials

chemical resistant material, heat resistant material

### Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance</b>	forms crystals during cooling	<b>Physical State</b>	liquid
<b>Odor</b>	mothball odor	<b>Color</b>	Not available
<b>Odor Threshold</b>	0.003 ppm	<b>pH</b>	Not available
<b>Melting Point</b>	77 - 80 °C	<b>Boiling Point</b>	218 °C
<b>Boiling Point Range</b>	Not available	<b>Freezing point</b>	Not available
<b>Evaporation Rate</b>	<1 (Ether = 1 )	<b>Flammability (solid, gas)</b>	Not applicable
<b>Autoignition Temperature</b>	526 °C	<b>Flash Point</b>	>80 °C
<b>Lower Explosive Limit</b>	0.9 % (by volume )	<b>Decomposition temperature</b>	Not available
<b>Upper Explosive Limit</b>	5.9 % (by volume )	<b>Vapor Pressure</b>	0.187 mmHg @ 20 °C
<b>Vapor Density (air=1)</b>	4.42	<b>Specific Gravity (water=1)</b>	1.028 at 4 °C
<b>Water Solubility</b>	0.003 wt%	<b>Partition coefficient: n-octanol/water</b>	Not available



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<b>Viscosity</b>	Not available	<b>Kinematic viscosity</b>	Not available
<b>Solubility (Other)</b>	Not available	<b>Density</b>	1.162 g/cc at 4 °C
<b>Log KOW</b>	3.7 at 25 °C	<b>Physical Form</b>	liquid when loaded , solid at room temperature , changes from solid to liquid as temperature increases
<b>Volatility by Volume</b>	>99 %	<b>Molecular Weight</b>	Not available

### Other Information

No additional information is available.

## 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.

### Incompatible Materials

oxidizing materials

### Hazardous decomposition products

oxides of carbon

## Section 11 - TOXICOLOGICAL INFORMATION

### Information on Likely Routes of Exposure

#### Inhalation

May be harmful if inhaled.

#### Skin Contact

Harmful in contact with skin. Causes skin irritation. May cause allergic skin reaction.

#### Eye Contact

Causes serious eye irritation.

#### Ingestion

Harmful if swallowed.

### 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:

#### Naphthalene (91-20-3)

Oral LD50 Rat 1110 mg/kg

Dermal LD50 Rabbit 1120 mg/kg

Inhalation LC50 Rat >340 mg/m<sup>3</sup> 1 h

#### Quinoline (91-22-5)

Oral LD50 Rat 331 mg/kg





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Dermal LD50 Rabbit 540 µL/kg

### 3,5-Xylenol (108-68-9)

Oral LD50 Rat 608 mg/kg

Dermal LD50 Rabbit 2000 mg/kg

### Product Toxicity Data

#### Acute Toxicity Estimate

Dermal	1110 mg/kg
Oral	1013 mg/kg

### Immediate Effects

Harmful if swallowed. Harmful in contact with skin. Causes skin irritation. Causes serious eye irritation. May cause allergic skin reaction. Causes damage to organs.

### Delayed Effects

Suspected of causing genetic defects. May cause cancer. Causes damage to organs through prolonged or repeated exposure. May cause damage to organs through prolonged or repeated exposure.

### Irritation/Corrosivity Data

Causes skin irritation. Causes serious eye irritation.

### Respiratory Sensitization

No data available.

### Dermal Sensitization

May cause allergic skin reaction.

### Component Carcinogenicity

Naphthalene	91-20-3
ACGIH:	A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
IARC:	Monograph 82 [2002] (Group 2B (possibly carcinogenic to humans))
NTP:	Reasonably Anticipated To Be A Human Carcinogen
Quinoline	91-22-5
IARC:	Monograph 121 [in preparation] (Group 2B (possibly carcinogenic to humans))
OSHA:	Present
3,5-Xylenol	108-68-9
ACGIH:	A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

May cause cancer.

### Germ Cell Mutagenicity

Suspected of causing genetic defects.

### Tumorigenic Data

No data available

### Reproductive Toxicity

No data available for the mixture.

### Specific Target Organ Toxicity - Single Exposure



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blood, eyes, respiratory system, hematopoietic system, cardiovascular system, central nervous system, kidneys, liver.

### **Specific Target Organ Toxicity - Repeated Exposure**

hematopoietic system, cardiovascular system, central nervous system, kidneys, liver, respiratory system, bone marrow, lungs.

### **Aspiration hazard**

No data available.

### **Medical Conditions Aggravated by Exposure**

respiratory disorders, skin disorders, eye disorders, blood system disorders

## **Section 12 - ECOLOGICAL INFORMATION**

### **Ecotoxicity**

Very toxic to aquatic life with long lasting effects.

### **Component Analysis - Aquatic Toxicity**

<b>Naphthalene</b>	<b>91-20-3</b>
Fish:	LC50 96 h Pimephales promelas 5.74 - 6.44 mg/L [flow-through ]; LC50 96 h Oncorhynchus mykiss 1.6 mg/L [flow-through ]; LC50 96 h Oncorhynchus mykiss 0.91 - 2.82 mg/L [static ]; LC50 96 h Pimephales promelas 1.99 mg/L [static ]; LC50 96 h Lepomis macrochirus 31.0265 mg/L [static ]
Invertebrate:	LC50 48 h Daphnia magna 2.16 mg/L IUCLID ; EC50 48 h Daphnia magna 1.96 mg/L [Flow through ] EPA ; EC50 48 h Daphnia magna 1.09 - 3.4 mg/L [Static ] EPA
<b>Quinoline</b>	<b>91-22-5</b>
Fish:	LC50 96 h Pimephales promelas 77.8 mg/L [flow-through ]; LC50 96 h Pimephales promelas 46 mg/L [static ]; LC50 96 h Poecilia reticulata 40 mg/L [static ]
Algae:	EC50 72 h Desmodesmus subspicatus 84 mg/L [static ] EPA ; EC50 96 h Desmodesmus subspicatus 90 mg/L [static ] EPA
Invertebrate:	EC50 48 h Daphnia magna 28.5 mg/L IUCLID ; EC50 48 h Daphnia magna 45.9 - 57.3 mg/L [Static ] EPA

### **Algal Toxicity**

Naphthalene: 0.4 mg/L 72 hours EC50 Skeletonema costatum.

### **Persistence and Degradability**

Biodegradable.

### **Bioaccumulative Potential**

This material is believed not to bioaccumulate due to low water solubility. BCF for fish is 168.

### **Mobility**

The product has poor water-solubility.

### **Other Toxicity**

No data available.

## **Section 13 - DISPOSAL CONSIDERATIONS**

### **Disposal Methods**



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Dispose in accordance with all applicable regulations.

**Component Waste Numbers**

This product is classified as a Listed Hazardous Waste U165 as Naphthalene, upon disposal. This product may be classified as a Hazardous Waste for Toxicity Code D026 (Cresols) based on TCLP results.

### Section 14 - TRANSPORT INFORMATION

**US DOT Information:**

**Shipping Name:** NAPHTHALENE, MOLTEN

**Hazard Class:** 4.1

**UN/NA #:** UN2304

**Packing Group:** III

**Required Label(s):** 4.1

Marine pollutant

**Further information:** This material contains reportable quantity (RQ) Hazardous Substances. Applicable shipping classification

**IATA Information:**

Marine pollutant

**Further information:** Air shipment is prohibited.

**TDG Information:**

**Shipping Name:** NAPHTHALENE, MOLTEN

**Hazard Class:** 4.1

**UN#:** UN2304

**Packing Group:** III

**Required Label(s):** 4.1

Marine pollutant

**International Bulk Chemical Code**

This material does not contain any chemicals required by the IBC Code to be identified as dangerous chemicals in bulk.

**Further information**

US DOT Reportable Quantities NAPHTHALENE (91-20-3) 100 lbs RQ; 45.4 kg RQ; STCC Code: 2814149 , HAZ STCC: 4917473. ERG# 133

### 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.

Naphthalene	91-20-3
SARA 313:	0.1 % de minimis concentration
CERCLA:	100 lb final RQ ; 45.4 kg final RQ

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<b>Quinoline</b>	<b>91-22-5</b>
<b>SARA 313:</b>	1 % de minimis concentration
<b>CERCLA:</b>	5000 lb final RQ ; 2270 kg final RQ

**SARA Section 311/312 (40 CFR 370 Subparts B and C) reporting categories**

Flammable; Carcinogenicity; Acute toxicity; Skin Corrosion/Irritation; Respiratory/Skin Sensitization; Serious Eye Damage/Eye Irritation; Specific Target Organ Toxicity; Germ Cell Mutagenicity

**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
<b>Naphthalene</b>	<b>91-20-3</b>	Yes	Yes	Yes	Yes	Yes
<b>Quinoline</b>	<b>91-22-5</b>	Yes	Yes	Yes	Yes	Yes
<b>Indene</b>	<b>95-13-6</b>	Yes	Yes	Yes	Yes	Yes

**California Safe Drinking Water and Toxic Enforcement Act (Proposition 65)**



**WARNING**

This product can expose you to chemicals including Naphthalene, Quinoline , which are known to the State of California to cause cancer. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

**Component Analysis - Inventory**

**Naphthalene (91-20-3)**

US	CA	AU	CN	EU	JP - ENCS	JP - ISHL	KR KECI - Annex 1	KR KECI - Annex 2
Yes	DSL	Yes	Yes	EIN	Yes	Yes	Yes	No

KR - REACH CCA	MX	NZ	PH	TH-TECI	TW	VN (Draft)
No	Yes	Yes	Yes	Yes	Yes	Yes

**Benzo[b]thiophene (95-15-8)**

US	CA	AU	CN	EU	JP - ENCS	JP - ISHL	KR KECI - Annex 1	KR KECI - Annex 2
Yes	NSL	No	Yes	EIN	No	Yes	No	Yes

KR - REACH CCA	MX	NZ	PH	TH-TECI	TW	VN (Draft)
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No	No	Yes	No	Yes	Yes	Yes
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### Quinoline (91-22-5)

US	CA	AU	CN	EU	JP - ENCS	JP - ISHL	KR KECI - Annex 1	KR KECI - Annex 2
Yes	DSL	Yes	Yes	EIN	Yes	Yes	Yes	No

KR - REACH CCA	MX	NZ	PH	TH-TECI	TW	VN (Draft)
Yes	Yes	Yes	Yes	No	Yes	Yes

### 2-Methylnaphthalene (91-57-6)

US	CA	AU	CN	EU	JP - ENCS	JP - ISHL	KR KECI - Annex 1	KR KECI - Annex 2
Yes	DSL	Yes	Yes	EIN	Yes	Yes	Yes	No

KR - REACH CCA	MX	NZ	PH	TH-TECI	TW	VN (Draft)
No	Yes	Yes	Yes	No	Yes	Yes

### Cresol (1319-77-3)

US	CA	AU	CN	EU	JP - ENCS	JP - ISHL	KR KECI - Annex 1	KR KECI - Annex 2
Yes	DSL	Yes	Yes	EIN	Yes	Yes	Yes	No

KR - REACH CCA	MX	NZ	PH	TH-TECI	TW	VN (Draft)
Yes	Yes	Yes	Yes	No	Yes	Yes

### 1-Methylnaphthalene (90-12-0)

US	CA	AU	CN	EU	JP - ENCS	JP - ISHL	KR KECI - Annex 1	KR KECI - Annex 2
Yes	DSL	Yes	Yes	EIN	Yes	Yes	Yes	No

KR - REACH CCA	MX	NZ	PH	TH-TECI	TW	VN (Draft)
No	No	Yes	Yes	Yes	Yes	Yes

### 3,5-Xylenol (108-68-9)



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US	CA	AU	CN	EU	JP - ENCS	JP - ISHL	KR KECI - Annex 1	KR KECI - Annex 2
Yes	DSL	Yes	Yes	EIN	Yes	Yes	Yes	No

KR - REACH CCA	MX	NZ	PH	TH-TECI	TW	VN (Draft)
Yes	No	Yes	Yes	Yes	Yes	Yes

### Indene (95-13-6)

US	CA	AU	CN	EU	JP - ENCS	JP - ISHL	KR KECI - Annex 1	KR KECI - Annex 2
Yes	DSL	Yes	Yes	EIN	Yes	Yes	Yes	No

KR - REACH CCA	MX	NZ	PH	TH-TECI	TW	VN (Draft)
No	Yes	Yes	Yes	No	Yes	Yes

### U.S. Inventory (TSCA)

Listed on inventory.

## Section 16 - OTHER INFORMATION

### NFPA Ratings

Health: 2 Fire: 2 Instability: 0

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

### Summary of Changes

SECTION 2: Hazard identification. SECTION 3: Composition / information on ingredients. SECTION 4: First aid measures. SECTION 11: Toxicological information.

### Preparation Date

7/19/2018

### Revision date

1/3/2020

### 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; F - Background (for Venezuela Biological Exposure Indices); 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



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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; KR REACH CCA - Korea Registration and Evaluation of Chemical Substances Chemical Control Act; 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; Ne- Non-specific; NFPA - National Fire Protection Agency; NIOSH - National Institute for Occupational Safety and Health; NJTSR - New Jersey Trade Secret Registry; Nq - Non-quantitative; NSL – Non-Domestic Substance List (Canada); 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; Sc - Semi-quantitative; STEL - Short-term Exposure Limit; TCCA – Korea Toxic Chemicals Control Act; TDG - Transportation of Dangerous Goods; TH-TECI - Thailand - FDA Existing Chemicals Inventory (TECI); 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 (Draft) - Vietnam (Draft); WHMIS - Workplace Hazardous Materials Information System (Canada).

### **Other Information**

#### **Disclaimer:**

The information set forth in this Safety Data Sheet does not purport to be all-inclusive and should be used only as a guide. While the information and recommendations set forth herein are believed to be accurate, the company makes no warranty regarding such information and recommendations and disclaims all liability from reliance thereon.

## SAFETY DATA SHEET

Creation Date 15-Jun-2010

Revision Date 31-Jul-2019

Revision Number 7

### 1. Identification

**Product Name** o-Xylene

**Cat No. :** O5081-4; O5081-4LC; O5081-500; O5081FB-200; DO5081-500

**CAS-No** 95-47-6  
**Synonyms** 1,2-Dimethylbenzene (Certified)

**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  
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 liquids	Category 3
Acute dermal toxicity	Category 4
Acute Inhalation Toxicity - Vapors	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, Central nervous system (CNS).	
Specific target organ toxicity - (repeated exposure)	Category 2
Target Organs - Liver.	
Aspiration Toxicity	Category 1

**Label Elements****Signal Word**

Danger



**Hazard Statements**

Flammable liquid and vapor  
May be fatal if swallowed and enters airways  
Harmful in contact with skin  
Causes skin irritation  
Causes serious eye irritation  
Harmful if inhaled  
May cause respiratory 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  
Wash face, hands and any exposed skin thoroughly after handling  
Do not breathe dust/fume/gas/mist/vapors/spray  
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**

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 if you feel unwell

**Skin**

Call a POISON CENTER or doctor/physician if you feel unwell  
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 CO<sub>2</sub>, 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)**

Harmful to aquatic life with long lasting effects

### 3. Composition/Information on Ingredients

Component	CAS-No	Weight %
o-Xylene	95-47-6	>95

### 4. First-aid measures

<b>General Advice</b>	If symptoms persist, call a physician.
<b>Eye Contact</b>	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.
<b>Skin Contact</b>	Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.
<b>Inhalation</b>	Move to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur. Risk of serious damage to the lungs.
<b>Ingestion</b>	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.
<b>Most important symptoms and effects</b>	Breathing difficulties. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting
<b>Notes to Physician</b>	Treat symptomatically

### 5. Fire-fighting measures

<b>Suitable Extinguishing Media</b>	Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide. Cool closed containers exposed to fire with water spray.
<b>Unsuitable Extinguishing Media</b>	Do not use a solid water stream as it may scatter and spread fire
<b>Flash Point</b>	31 °C / 87.8 °F
<b>Method -</b>	No information available
<b>Autoignition Temperature</b>	465 °C / 869 °F
<b>Explosion Limits</b>	
<b>Upper</b>	6.7 vol %
<b>Lower</b>	0.9 vol %
<b>Sensitivity to Mechanical Impact</b>	No information available
<b>Sensitivity to Static Discharge</b>	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<sub>2</sub>)

#### 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**  
3

**Flammability**  
3

**Instability**  
0

**Physical hazards**  
N/A

## 6. Accidental release measures

<b>Personal Precautions</b>	Use personal protective equipment. Ensure adequate ventilation. Remove all sources of ignition. Take precautionary measures against static discharges.
<b>Environmental Precautions</b>	Should not be released into the environment. See Section 12 for additional ecological information. Avoid release to the environment. Collect spillage. Do not flush into surface water or sanitary sewer system.
<b>Methods for Containment and Clean Up</b>	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

<b>Handling</b>	Wear personal protective equipment. 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. Take precautionary measures against static discharges.
<b>Storage</b>	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	Mexico OEL (TWA)
o-Xylene	TWA: 100 ppm STEL: 150 ppm		IDLH: 900 ppm TWA: 100 ppm TWA: 435 mg/m <sup>3</sup> STEL: 150 ppm STEL: 655 mg/m <sup>3</sup>	TWA: 100 ppm STEL: 150 ppm

### Legend

ACGIH - American Conference of Governmental Industrial Hygienists

NIOSH IDLH: The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health

<b>Engineering Measures</b>	Ensure that eyewash stations and safety showers are close to the workstation location. Ensure adequate ventilation, especially in confined areas. Use explosion-proof electrical/ventilating/lighting/equipment.
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### Personal Protective Equipment

<b>Eye/face Protection</b>	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.
<b>Skin and body protection</b>	Long sleeved clothing.
<b>Respiratory Protection</b>	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.
<b>Hygiene Measures</b>	Handle in accordance with good industrial hygiene and safety practice.

## 9. Physical and chemical properties

<b>Physical State</b>	Liquid
<b>Appearance</b>	Colorless
<b>Odor</b>	aromatic
<b>Odor Threshold</b>	No information available

pH	Not applicable
Melting Point/Range	-25 °C / -13 °F
Boiling Point/Range	143 - 145 °C / 289.4 - 293 °F
Flash Point	31 °C / 87.8 °F
Evaporation Rate	0.7
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	6.7 vol %
Lower	0.9 vol %
Vapor Pressure	882 Pa @ 25 °C
Vapor Density	3.7
Specific Gravity	0.884
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	465 °C / 869 °F
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	C8 H10
Molecular Weight	106.17

## 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 acids
Hazardous Decomposition Products	Carbon monoxide (CO), Carbon dioxide (CO <sub>2</sub> )
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
o-Xylene	LD50 = 3608 mg/kg ( Rat )	14100 mg/kg (Rabbit)	LC50 = 4330 ppm ( Rat ) 6 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
o-Xylene	95-47-6	Not listed	Not listed	Not listed	Not listed	Not listed

**Mutagenic Effects** No information available

**Reproductive Effects** No information available.

<b>Developmental Effects</b>	No information available.
<b>Teratogenicity</b>	No information available.
<b>STOT - single exposure</b> <b>STOT - repeated exposure</b>	Respiratory system Central nervous system (CNS) Liver
<b>Aspiration hazard</b>	Category 1
<b>Symptoms / effects, both acute and delayed</b>	Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting
<b>Endocrine Disruptor Information</b>	No information available
<b>Other Adverse Effects</b>	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. Do not empty into drains. The product contains following substances which are hazardous for the environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
o-Xylene	EC50: = 4.2 mg/L, 192h (Pseudokirchneriella subcapitata) EC50: = 4.7 mg/L, 72h static (Pseudokirchneriella subcapitata)	LC50: 16.1 mg/L/96h (Lepomis macrochirus) LC50: 13 mg/L/24h (Carassius auratus)	EC50 = 0.0084 mg/L 24 h	EC50: 2.61 - 5.59 mg/L, 48h Flow through (Daphnia magna) EC50: 0.78 - 2.51 mg/L, 48h Static (Daphnia magna) EC50: = 3.2 mg/L, 48h (Daphnia magna)

**Persistence and Degradability** Insoluble 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 volatility.

Component	log Pow
o-Xylene	3.12

## 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	UN1307
Proper Shipping Name	XYLENES
Hazard Class	3
Packing Group	III

### TDG

UN-No	UN1307
Proper Shipping Name	XYLENES
Hazard Class	3
Packing Group	III

### IATA

UN-No	UN1307
Proper Shipping Name	Xylenes
Hazard Class	3

<b>Packing Group</b>	III
<b>IMDG/IMO</b>	
<b>UN-No</b>	UN1307
<b>Proper Shipping Name</b>	Xylenes
<b>Hazard Class</b>	3
<b>Packing Group</b>	III

## 15. Regulatory information

### United States of America Inventory

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
o-Xylene	95-47-6	X	ACTIVE	-

#### Legend:

**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/NDL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
o-Xylene	95-47-6	X	-	202-422-2	X	X	X	X	KE-35429

### U.S. Federal Regulations

#### SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
o-Xylene	95-47-6	>95	1.0

**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
o-Xylene	X	-	-	-

#### Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
o-Xylene	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
o-Xylene	1000 lb	-

**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
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o-Xylene	X	X	X	X	-
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**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

**16. Other information**

**Prepared By** Regulatory Affairs  
Thermo Fisher Scientific  
Email: EMSDS.RA@thermofisher.com

**Creation Date** 15-Jun-2010  
**Revision Date** 31-Jul-2019  
**Print Date** 31-Jul-2019  
**Revision Summary** SDS sections updated. 11. 16.

**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**

IN CASE OF TRANSPORTATION EMERGENCY CONTACT:

**CHEMTREC:(800) 424-9300**

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ALL OTHER INQUIRIES:  
(770) 904-7042 // [www.ciscochem.com](http://www.ciscochem.com)  
266 Rue Cezzan Lavonia, GA 30553



## 1. IDENTIFICATION

SUBSTANCE: TETRACHLOROETHYLENE

TRADE NAMES/SYNONYMS:

PERCHLOROETHYLENE; 1,1,2,2-TETRACHLOROETHYLENE; ETHYLENE TETRACHLORIDE; PERC;  
TETRACHLORETHYLENE; PERCHLORETHYLENE; TETRACHLOROETHENE

CHEMICAL FAMILY: halogenated, aliphatic

## 2. HAZARDS IDENTIFICATION

NFPA RATINGS (SCALE 0-4): HEALTH=3 FIRE=0 REACTIVITY=0

EMERGENCY OVERVIEW:

COLOR: colorless

PHYSICAL FORM: volatile liquid

ODOR: faint odor, sweet odor

MAJOR HEALTH HAZARDS: respiratory tract irritation, skin irritation, eye irritation, central nervous system depression, cancer hazard (in humans)

POTENTIAL HEALTH EFFECTS:

INHALATION:

SHORT TERM EXPOSURE: irritation, nausea, vomiting, chest pain, difficulty breathing, irregular heartbeat, headache, drowsiness, dizziness, disorientation, mood swings, loss of coordination, blurred vision, lung congestion, kidney damage, liver damage

LONG TERM EXPOSURE: irritation, nausea, stomach pain, loss of appetite, headache, drowsiness, dizziness, disorientation, sleep disturbances, pain in extremities, loss of coordination, blurred vision, hormonal disorders, internal bleeding, heart damage, liver damage, birth defects, brain damage, tumors, cancer

SKIN CONTACT:

SHORT TERM EXPOSURE: irritation (possibly severe)

LONG TERM EXPOSURE: irritation

EYE CONTACT:

SHORT TERM EXPOSURE: irritation

LONG TERM EXPOSURE: irritation

INGESTION:

SHORT TERM EXPOSURE: same as effects reported in short term inhalation

LONG TERM EXPOSURE: same as effects reported in long term inhalation

## 3. COMPOSITION

COMPONENT: TETRACHLOROETHYLENE

CAS NUMBER: 127-18-4

PERCENTAGE: 100.0



Hazardous: YES

## 4. FIRST AID MEASURES

### Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

### Ingestion:

Aspiration hazard. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.

### Skin Contact:

Wash skin with soap or mild detergent and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Call a physician.

### Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

### Note to Physician:

Do not administer adrenaline or epinephrine to a victim of chlorinated solvent poisoning.

## 5. FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Negligible fire hazard.

EXTINGUISHING MEDIA: carbon dioxide, regular dry chemical

Large fires: Use regular foam or flood with fine water spray.

FIRE FIGHTING: Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. For tank, rail car or tank truck, evacuation radius: 800 meters (1/2 mile).

FLASH POINT: No data available.

### Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode

## 6. ACCIDENTAL RELEASE MEASURES

### SOIL RELEASE:

Dig holding area such as lagoon, pond or pit for containment. Dike for later disposal. Absorb with sand or other non-combustible material.

### WATER RELEASE:

Absorb with activated carbon. Remove trapped material with suction hoses. Subject to California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). Keep out of water supplies and sewers.

### OCCUPATIONAL RELEASE:

Avoid heat, flames, sparks and other sources of ignition. Stop leak if possible without personal risk. Small liquid spills: Absorb with sand or other non-combustible material. Large spills: Dike for later disposal. Remove sources of ignition. 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).

## 7. HANDLING AND STORAGE

Store in a cool, dry, ventilated area away from sources of heat or ignition. Isolate from flammable materials. Protect from direct sunlight. Wear special protective equipment (Sec. 8) for maintenance break-in or where exposures may exceed established exposure levels. Wash hands, face, forearms and neck when exiting restricted areas. Shower, dispose of outer clothing, change to clean garments at the end of the day. Avoid cross-contamination of street clothes. Wash hands before eating and do not eat, drink, or

smoke in workplace. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

## 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Airborne Exposure Limits:

-OSHA Permissible Exposure Limit (PEL): 100 ppm (TWA), 200 ppm (ceiling), 300 ppm/5min/3-hour (max)  
-ACGIH Threshold Limit Value (TLV):  
25 ppm (TWA), 100 ppm (STEL); listed as A3, animal carcinogen

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, Industrial Ventilation, A Manual of Recommended Practices, most recent edition, for details.

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded, wear a supplied air, full-facepiece respirator, airlined hood, or full-facepiece self-contained breathing apparatus.

Skin Protection:

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:

Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

CLOTHING: Wear appropriate chemical resistant clothing. GLOVES: Wear appropriate chemical resistant gloves.

RESPIRATOR: The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA.

At any detectable concentration -

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.

For Unknown Concentrations or Immediately Dangerous to Life or Health -

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.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: liquid

APPEARANCE: clear

COLOR: colorless

PHYSICAL FORM: volatile liquid

ODOR: faint odor, sweet odor

MOLECULAR WEIGHT: 165.83

MOLECULAR FORMULA: Cl<sub>2</sub>-C-C-Cl<sub>2</sub>

BOILING POINT: 250 F (121 C)

FREEZING POINT: -2 F (-19 C)

VAPOR PRESSURE: 14 mmHg @ 20 C

VAPOR DENSITY (air=1): 5.83  
SPECIFIC GRAVITY (water=1): 1.6227  
WATER SOLUBILITY: 0.015%  
PH: Not available  
VOLATILITY: Not available  
ODOR THRESHOLD: 50 ppm  
EVAPORATION RATE: 2.8 (butyl acetate=1)  
COEFFICIENT OF WATER/OIL DISTRIBUTION: Not available  
SOLVENT SOLUBILITY:  
Soluble: alcohol, ether, benzene, chloroform, oils

## 10. STABILITY AND REACTIVITY

### Stability:

Stable under ordinary conditions of use and storage. Slowly decomposed by light. Deteriorates rapidly in warm, moist climates.

### Hazardous Decomposition Products:

Carbon dioxide and carbon monoxide may form when heated to decomposition. Hydrogen chloride gas and phosgene gas may be formed upon heating. Decomposes with moisture to yield trichloroacetic acid and hydrochloric acid.

### Hazardous Polymerization:

Will not occur.

### Incompatibilities:

Strong acids, strong oxidizers, strong alkalis, especially NaOH, KOH; finely divided metals, especially zinc, barium, lithium. Slowly corrodes aluminum, iron and zinc.

### Conditions to Avoid:

Moisture, light, heat and incompatibles.

## 11. TOXICOLOGICAL INFORMATION

### TETRACHLOROETHYLENE:

IRRITATION DATA: 810 mg/24 hour(s) skin-rabbit severe; 500 mg/24 hour(s) skin-rabbit mild; 162 mg eyes-rabbit mild; 500 mg/24 hour(s) eyes-rabbit mild

TOXICITY DATA: 4100 ppm/6 hour(s) inhalation-rat LC50; >10000 mg/kg skin-rabbit LD50 (Dow); 2629 mg/kg oral-rat LD50

CARCINOGEN STATUS: NTP: Anticipated Human Carcinogen; IARC: Human Limited Evidence, Animal Sufficient Evidence, Group 2A; ACGIH: A3 -Confirmed Animal Carcinogen; EC: Category 2

### LOCAL EFFECTS:

Irritant: inhalation, skin, eye

### ACUTE TOXICITY LEVEL:

Moderately Toxic: ingestion

Slightly Toxic: inhalation

TARGET ORGANS: central nervous system

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: eye disorders, heart or cardiovascular disorders, kidney disorders, liver disorders, nervous system disorders, skin disorders and allergies

TUMORIGENIC DATA: Available.

MUTAGENIC DATA: Available.

REPRODUCTIVE EFFECTS DATA: Available.

ADDITIONAL DATA: May be excreted in breast milk. Alcohol may enhance the toxic effects. Stimulants such as epinephrine may induce ventricular fibrillation.

## 12. ECOLOGICAL INFORMATION

### ECOTOXICITY DATA:

FISH TOXICITY: 8430 ug/L 96 hour(s) LC50 (Mortality) Flagfish (*Jordanella floridae*)

INVERTEBRATE TOXICITY: 7500 ug/L 48 hour(s) EC50 (Immobilization) Water flea (*Daphnia magna*)

ALGAL TOXICITY: 509000 ug/L 96 hour(s) EC50 (Photosynthesis) Diatom (*Skeletonema costatum*)

### FATE AND TRANSPORT:

BIOCONCENTRATION: 49 ug/L 1-21 hour(s) BCF (Residue) Bluegill (*Lepomis macrochirus*) 3.43 ug/L

#### Environmental Fate:

When released into the soil, this material is expected to quickly evaporate. When released into the soil, this material may leach into groundwater. When released into the soil, this material may biodegrade to a moderate extent. When released to water, this material is expected to quickly evaporate. When released into water, this material is not expected to biodegrade. This material is not expected to significantly bioaccumulate. When released into the air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals.

#### Environmental Toxicity:

The LC50/96-hour values for fish are between 1 and 10 mg/l. The LC50/96-hour values for fish are between 10 and 100 mg/l. This material is expected to be toxic to aquatic life.

## 13. DISPOSAL CONSIDERATIONS

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

## 14. TRANSPORT INFORMATION

### Domestic (Land, D.O.T.)

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Proper Shipping Name: TETRACHLOROETHYLENE Hazard Class: 6.1

UN/NA: UN1897

Packing Group: III

Information reported for product/size: 20L

International (Water, I.M.O.)

-----  
Proper Shipping Name: TETRACHLOROETHYLENE Hazard Class: 6.1

UN/NA: UN1897

Packing Group: III

Information reported for product/size: 20L

Proper shipping paperwork:

UN 1897, Tetrachoroethylene, 6.1, PG III

Marine Pollutant

## 15. REGULATORY INFORMATION

### U.S. REGULATIONS:

CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4): TETRACHLOROETHYLENE  
(PERCHLOROETHYLENE): 100 LBS RQ

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES

(40 CFR 355 Subpart B): Not regulated.

**SARA TITLE III SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES**

(40 CFR 355 Subpart C): Not regulated.

**SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370 Subparts B and C):**

ACUTE: Yes

CHRONIC: Yes

FIRE: No

REACTIVE: No

SUDDEN RELEASE: No

**SARA TITLE III SECTION 313 (40 CFR 372.65): TETRACHLOROETHYLENE (PERCHLOROETHYLENE)**

OSHA PROCESS SAFETY (29 CFR 1910.119): Not regulated.

**STATE REGULATIONS:**

California Proposition 65:

Known to the state of California to cause the following: TETRACHLOROETHYLENE (PERCHLOROETHYLENE) Cancer (Apr 01, 1988)

CANADIAN REGULATIONS: WHMIS CLASSIFICATION: D2

**NATIONAL INVENTORY STATUS:**

U.S. INVENTORY (TSCA): Listed on inventory.

TSCA 12(b) EXPORT NOTIFICATION: Not listed. CANADA INVENTORY (DSL/NDSL): Not determined.

## 16. OTHER INFORMATION

NFPA Ratings: Health: 2 Flammability: 0 Reactivity: 0

**Label Hazard Warning:**

WARNING! HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. SUSPECT CANCER HAZARD. MAY CAUSE CANCER. Risk of cancer depends on level and duration of exposure.

**Label Precautions:**

Do not get in eyes, on skin, or on clothing.

Do not breathe vapor or mist.

Keep container closed.

Use only with adequate ventilation.

Wash thoroughly after handling.

**Label First Aid:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. In all cases call a physician.

**Product Use:**

Laboratory Reagent.

CISCO provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product.

Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. CISCO MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS.

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Date Created: 5/18/2015

Date Updated: 6/11/2015



# Fisher Scientific

Part of Thermo Fisher Scientific

## SAFETY DATA SHEET

Revision Date 10-Feb-2015

Revision Number 1

### 1. Identification

**Product Name** Pyrene, ca 96%

**Cat No. :** AC157651000; AC157655000

**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**

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 %
Pyrene	129-00-0	96.0

### 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.

<b>Inhalation</b>	Move to fresh air.
<b>Ingestion</b>	Do not induce vomiting.
<b>Most important symptoms/effects</b>	No information available.
<b>Notes to Physician</b>	Treat symptomatically

## 5. Fire-fighting measures

<b>Unsuitable Extinguishing Media</b>	No information available
<b>Flash Point</b>	°C
<b>Method -</b>	No information available
<b>Autoignition Temperature</b>	No information available
<b>Explosion Limits</b>	
<b>Upper</b>	No data available
<b>Lower</b>	No data available
<b>Sensitivity to Mechanical Impact</b>	No information available
<b>Sensitivity to Static Discharge</b>	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**  
1

**Flammability**  
1

**Instability**  
0

**Physical hazards**  
N/A

## 6. Accidental release measures

<b>Personal Precautions</b>	Ensure adequate ventilation. Use personal protective equipment.
<b>Environmental Precautions</b>	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

<b>Handling</b>	Ensure adequate ventilation.
<b>Storage</b>	Keep containers tightly closed in a dry, cool and well-ventilated place.

## 8. Exposure controls / personal protection

<b>Exposure Guidelines</b>	This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.
<b>Engineering Measures</b>	Ensure adequate ventilation, especially in confined areas.
<b>Personal Protective Equipment</b>	
<b>Eye/face Protection</b>	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	Yellow
Odor	Odorless
Odor Threshold	No information available
pH	
Melting Point/Range	156 °C
Boiling Point/Range	°C @ 760 mmHg
Flash Point	°C
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 @ 20 °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	No information available
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	C16H10
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	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
Pyrene	2700 mg/kg ( Rat )	Not listed	Not listed

**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
Pyrene	129-00-0	group 3	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.

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** No information available.

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** 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
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	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
Pyrene	-	-	X	X

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration  
Not applicable**CERCLA**

Not applicable

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** 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

Revision Date 19-Jan-2018

Revision Number 3

### 1. Identification

**Product Name** sec-Butylbenzene

**Cat No. :** AC107860000; AC107860050; AC107860500; AC107862500

**CAS-No** 135-98-8  
**Synonyms** 2-Phenylbutane

**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	Acros Organics
One Reagent Lane	One Reagent Lane
Fair Lawn, NJ 07410	Fair Lawn, NJ 07410
Tel: (201) 796-7100	

**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

**Label Elements**

**Signal Word**

Warning

**Hazard Statements**

Flammable liquid and vapor  
Causes skin irritation  
Causes serious eye irritation

**Precautionary Statements****Prevention**

Wash face, hands and any exposed skin thoroughly after handling  
Wear protective gloves/protective clothing/eye protection/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

**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

**Fire**

In case of fire: Use CO<sub>2</sub>, dry chemical, or foam for extinction

**Storage**

Store in a well-ventilated place. Keep cool

**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 %
sec-Butylbenzene	135-98-8	> 99

### 4. First-aid measures

**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 soap and plenty of water while removing all contaminated clothes and shoes. Get medical attention.

**Inhalation**

Remove from exposure, lie down. Remove to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention.

**Ingestion**

Clean mouth with water. Get medical attention.

**Most important symptoms and effects**

Difficulty in breathing. . Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting

**Notes to Physician**

Treat symptomatically

## 5. Fire-fighting measures

<b>Suitable Extinguishing Media</b>	Water spray. Carbon dioxide (CO <sub>2</sub> ). Dry chemical. Water mist may be used to cool closed containers. Chemical foam. Water mist may be used to cool closed containers.
<b>Unsuitable Extinguishing Media</b>	No information available
<b>Flash Point</b>	45 °C / 113 °F
<b>Method -</b>	No information available
<b>Autoignition Temperature</b>	415 °C / 779 °F
<b>Explosion Limits</b>	
<b>Upper</b>	6.90%
<b>Lower</b>	0.80%
<b>Sensitivity to Mechanical Impact</b>	No information available
<b>Sensitivity to Static Discharge</b>	No information available

### Specific Hazards Arising from the Chemical

Flammable. Vapors may travel to source of ignition and flash back. Containers may explode when heated. Vapors may form explosive mixtures with air.

### Hazardous Combustion Products

Carbon monoxide (CO). Carbon dioxide (CO<sub>2</sub>).

### 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**  
2

**Flammability**  
2

**Instability**  
0

**Physical hazards**  
N/A

## 6. Accidental release measures

<b>Personal Precautions</b>	Remove all sources of ignition. Take precautionary measures against static discharges.
<b>Environmental Precautions</b>	See Section 12 for additional Ecological Information.
<b>Methods for Containment and Clean Up</b>	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

<b>Handling</b>	Avoid contact with skin and eyes. Do not breathe mist/vapors/spray. Take precautionary measures against static discharges. Use spark-proof tools and explosion-proof equipment. Use only non-sparking tools. Keep away from open flames, hot surfaces and sources of ignition.
<b>Storage</b>	Keep in a dry, cool and well-ventilated place. Refer product specification and/or product label for specific storage temperature requirement. Keep container tightly closed. Keep away from heat, sparks and flame. Flammables area. Keep container tightly closed in a dry and well-ventilated place.

## 8. Exposure controls / personal protection

<b>Exposure Guidelines</b>	This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.
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**Engineering Measures** Ensure adequate ventilation, especially in confined areas. 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** 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

<b>Physical State</b>	Liquid
<b>Appearance</b>	Colorless
<b>Odor</b>	Odorless
<b>Odor Threshold</b>	No information available
<b>pH</b>	No information available
<b>Melting Point/Range</b>	-75 °C / -103 °F
<b>Boiling Point/Range</b>	173 - 174 °C / 343.4 - 345.2 °F @ 760 mmHg
<b>Flash Point</b>	45 °C / 113 °F
<b>Evaporation Rate</b>	No information available
<b>Flammability (solid,gas)</b>	Not applicable
<b>Flammability or explosive limits</b>	
Upper	6.90%
Lower	0.80%
<b>Vapor Pressure</b>	1.33 hPa @ 19 °C
<b>Vapor Density</b>	4.62
<b>Specific Gravity</b>	0.860
<b>Solubility</b>	No information available
<b>Partition coefficient; n-octanol/water</b>	No data available
<b>Autoignition Temperature</b>	415 °C / 779 °F
<b>Decomposition Temperature</b>	No information available
<b>Viscosity</b>	No information available
<b>Molecular Formula</b>	C10 H14
<b>Molecular Weight</b>	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. Incompatible products.

**Incompatible Materials** Strong oxidizing agents

**Hazardous Decomposition Products** Carbon monoxide (CO), Carbon dioxide (CO<sub>2</sub>)

**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

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
sec-Butylbenzene	LD50 = 2240 µL/kg ( Rat )	LD50 > 16 mL/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
sec-Butylbenzene	135-98-8	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** 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

Do not empty into drains.

**Persistence and Degradability** Insoluble in water May persist based on information available.

**Bioaccumulation/ Accumulation** No information available.

**Mobility** . Is not likely mobile in the environment due its low water solubility.

Component	log Pow
sec-Butylbenzene	4.24

## 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 UN2709  
 Hazard Class 3  
 Packing Group III

**TDG**

UN-No UN2709  
 Hazard Class 3  
 Packing Group III

**IATA**

UN-No UN2709  
 Proper Shipping Name BUTYLBENZENES  
 Hazard Class 3  
 Packing Group III

**IMDG/IMO**

UN-No UN2709  
 Proper Shipping Name BUTYLBENZENES  
 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
sec-Butylbenzene	135-98-8	X	ACTIVE	-

**Legend:**

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), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDSL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
sec-Butylbenzene	135-98-8	X	-	205-227-0	X	X	X	X	KE-04204

**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
sec-Butylbenzene	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

**16. Other information**

**Prepared By** Regulatory Affairs  
Thermo Fisher Scientific  
Email: EMSDS.RA@thermofisher.com

**Revision Date** 19-Jan-2018

**Print Date** 19-Jan-2018

**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**

Creation Date 11-Jun-2009

Revision Date 17-Jan-2018

Revision Number 4

**1. Identification**

**Product Name** Toluene

**Cat No. :** T326F-1GAL; T326P-4; T326S-20; T326S-20LC

**CAS-No** 108-88-3  
**Synonyms** Tol; Methylbenzene

**Recommended Use** Laboratory chemicals.  
**Uses advised against** Not for food, drug, pesticide or biocidal product use

**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)

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 2
Target Organs - Kidney, Liver, spleen, 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 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  
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 CO<sub>2</sub>, 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)

**WARNING.** Reproductive Harm - <https://www.p65warnings.ca.gov/>.

## 3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Toluene	108-88-3	>95

#### 4. First-aid measures

<b>General Advice</b>	If symptoms persist, call a physician.
<b>Eye Contact</b>	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.
<b>Skin Contact</b>	Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.
<b>Inhalation</b>	Move to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur. Risk of serious damage to the lungs.
<b>Ingestion</b>	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.
<b>Most important symptoms and effects</b>	Breathing difficulties. Causes central nervous system depression: Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting
<b>Notes to Physician</b>	Treat symptomatically

#### 5. Fire-fighting measures

<b>Suitable Extinguishing Media</b>	Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide. Cool closed containers exposed to fire with water spray.
<b>Unsuitable Extinguishing Media</b>	No information available
<b>Flash Point</b>	4 °C / 39.2 °F
<b>Method -</b>	No information available
<b>Autoignition Temperature</b>	535 °C / 995 °F
<b>Explosion Limits</b>	
<b>Upper</b>	7.1 vol %
<b>Lower</b>	1.1 vol %
<b>Oxidizing Properties</b>	Not oxidising
<b>Sensitivity to Mechanical Impact</b>	No information available
<b>Sensitivity to Static Discharge</b>	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<sub>2</sub>)

#### 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**  
3

**Flammability**  
3

**Instability**  
0

**Physical hazards**  
N/A

#### 6. Accidental release measures

<b>Personal Precautions</b>	Use personal protective equipment. Ensure adequate ventilation. Remove all sources of ignition. Take precautionary measures against static discharges.
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**Environmental Precautions** Should not be released into the environment. 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. 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 and sources of ignition.

## 8. Exposure controls / personal protection

### Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Toluene	TWA: 20 ppm	(Vacated) TWA: 100 ppm (Vacated) TWA: 375 mg/m <sup>3</sup> Ceiling: 300 ppm (Vacated) STEL: 150 ppm (Vacated) STEL: 560 mg/m <sup>3</sup> TWA: 200 ppm	IDLH: 500 ppm TWA: 100 ppm TWA: 375 mg/m <sup>3</sup> STEL: 150 ppm STEL: 560 mg/m <sup>3</sup>	TWA: 50 ppm TWA: 188 mg/m <sup>3</sup>

### 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. 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** 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	Liquid
Appearance	Colorless
Odor	aromatic
Odor Threshold	1.74 ppm
pH	Not applicable
Melting Point/Range	-95 °C / -139 °F

Boiling Point/Range	111 °C / 231.8 °F @ 760 mmHg
Flash Point	4 °C / 39.2 °F
Evaporation Rate	2.4 (Butyl acetate = 1.0)
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	7.1 vol %
Lower	1.1 vol %
Vapor Pressure	29 mbar @ 20 °C
Vapor Density	3.1
Specific Gravity	0.866
Solubility	Insoluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	535 °C / 995 °F
Decomposition Temperature	No information available
Viscosity	0.6 mPa.s @ 20 °C
Molecular Formula	C7 H8
Molecular Weight	92.14

## 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 acids, Strong bases, Halogenated compounds
Hazardous Decomposition Products	Carbon monoxide (CO), Carbon dioxide (CO <sub>2</sub> )
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
Toluene	> 5000 mg/kg ( Rat )	LD50 = 12000 mg/kg ( Rabbit )	26700 ppm ( 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
Toluene	108-88-3	Not listed	Not listed	Not listed	Not listed	Not listed

**Mutagenic Effects** Not mutagenic in AMES Test

**Reproductive Effects** Experiments have shown reproductive toxicity effects on laboratory animals.

**Developmental Effects** Developmental effects have occurred in experimental animals.



<b>Teratogenicity</b>	Possible risk of harm to the unborn child.
<b>STOT - single exposure</b>	Respiratory system Central nervous system (CNS)
<b>STOT - repeated exposure</b>	Kidney Liver spleen Blood
<b>Aspiration hazard</b>	No information available
<b>Symptoms / effects, both acute and delayed</b>	Causes central nervous system depression: Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting
<b>Endocrine Disruptor Information</b>	No information available
<b>Other Adverse Effects</b>	The toxicological properties have not been fully investigated.

## 12. Ecological information

### Ecotoxicity

Contains a substance which is: The product contains following substances which are hazardous for the environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Toluene	EC50: = 12.5 mg/L, 72h static (Pseudokirchneriella subcapitata) EC50: > 433 mg/L, 96h (Pseudokirchneriella subcapitata)	50-70 mg/L LC50 96 h 5-7 mg/L LC50 96 h 15-19 mg/L LC50 96 h 28 mg/L LC50 96 h 12 mg/L LC50 96 h	EC50 = 19.7 mg/L 30 min	EC50: = 11.5 mg/L, 48h (Daphnia magna) EC50: 5.46 - 9.83 mg/L, 48h Static (Daphnia magna)

**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.

Component	log Pow
Toluene	2.7

## 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
Toluene - 108-88-3	U220	-

## 14. Transport information

### DOT

UN-No	UN1294
Proper Shipping Name	TOLUENE
Hazard Class	3
Packing Group	II

### TDG

UN-No	UN1294
Proper Shipping Name	TOLUENE
Hazard Class	3
Packing Group	II

### IATA

UN-No	UN1294
Proper Shipping Name	TOLUENE
Hazard Class	3

Packing Group	II
<b>IMDG/IMO</b>	
UN-No	UN1294
Proper Shipping Name	TOLUENE
Hazard Class	3
Packing Group	II

## 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
Toluene	X	X	-	203-625-9	-		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 %
Toluene	108-88-3	>95	1.0

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
Toluene	X	1000 lb	X	X

### Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Toluene	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
Toluene	1000 lb 1 lb	-

California Proposition 65 This product contains the following proposition 65 chemicals

Component	CAS-No	California Prop. 65	Prop 65 NSRL	Category
Toluene	108-88-3	Developmental	-	Developmental

**U.S. State Right-to-Know Regulations**

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Toluene	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

**16. Other information**

**Prepared By** Regulatory Affairs  
Thermo Fisher Scientific  
Email: EMSDS.RA@thermofisher.com

**Creation Date** 11-Jun-2009

**Revision Date** 17-Jan-2018

**Print Date** 17-Jan-2018

**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

Creation Date 03-Feb-2010

Revision Date 14-Jul-2016

Revision Number 2

## 1. Identification

**Product Name** Trichloroethylene

**Cat No. :** T340-4; T341-4; T341-20; T341-500; T403-4

**Synonyms** Trichloroethene (Stabilized/Technical/Electronic/Certified ACS)

**Recommended Use** Laboratory chemicals.

**Uses advised against**

### 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
Skin Sensitization	Category 1
Germ Cell Mutagenicity	Category 2
Carcinogenicity	Category 1A
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Central nervous system (CNS).	
Specific target organ toxicity - (repeated exposure)	Category 2
Target Organs - Kidney, Liver, Heart, spleen, Blood.	

**Label Elements****Signal Word**

Danger

**Hazard Statements**

Causes skin irritation  
Causes serious eye irritation  
May cause an allergic skin reaction  
May cause drowsiness or dizziness  
Suspected of causing genetic defects  
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  
Contaminated work clothing should not be allowed out of the workplace  
Do not breathe dust/fume/gas/mist/vapors/spray  
Use only outdoors or in a well-ventilated area  
Wear protective gloves/protective clothing/eye protection/face protection

**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  
Take off contaminated clothing and wash before reuse  
If skin irritation or rash 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 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)**

Harmful to aquatic life with long lasting effects  
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 %
Trichloroethylene	79-01-6	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**

Move 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/effects** None reasonably foreseeable. May cause allergic skin reaction. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting: 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** 410 °C / 770 °F

### Explosion Limits

**Upper** 10.5 vol %

**Lower** 8 vol %

**Oxidizing Properties** Not oxidising

**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. Containers may explode when heated. Keep product and empty container away from heat and sources of ignition.

### Hazardous Combustion Products

Hydrogen chloride gas Chlorine Phosgene Carbon monoxide (CO) Carbon dioxide (CO<sub>2</sub>)

### 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**  
2

**Flammability**  
1

**Instability**  
0

**Physical hazards**  
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.

**Environmental Precautions** Should not be released into the environment. 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.

## 7. Handling and storage

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

**Storage** Keep containers tightly closed in a dry, cool and well-ventilated place. Protect from light. Do not store in aluminum containers.

## 8. Exposure controls / personal protection

### Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Trichloroethylene	TWA: 10 ppm STEL: 25 ppm	(Vacated) TWA: 50 ppm (Vacated) TWA: 270 mg/m <sup>3</sup> Ceiling: 200 ppm (Vacated) STEL: 200 ppm (Vacated) STEL: 1080 mg/m <sup>3</sup> TWA: 100 ppm	IDLH: 1000 ppm	TWA: 100 ppm TWA: 535 mg/m <sup>3</sup> STEL: 200 ppm STEL: 1080 mg/m <sup>3</sup>

### 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 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

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	Liquid
Appearance	Colorless
Odor	Characteristic
Odor Threshold	No information available
pH	No information available
Melting Point/Range	-85 °C / -121 °F
Boiling Point/Range	87 °C / 188.6 °F
Flash Point	No information available
Evaporation Rate	0.69 (Carbon Tetrachloride = 1.0)
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	10.5 vol %
Lower	8 vol %
Vapor Pressure	77.3 mbar @ 20 °C
Vapor Density	4.5 (Air = 1.0)
Specific Gravity	1.460
Solubility	Slightly soluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	410 °C / 770 °F
Decomposition Temperature	> 120°C
Viscosity	0.55 mPa.s (25°C)

Molecular Formula  
Molecular Weight

C<sub>2</sub> H Cl<sub>3</sub>  
131.39

## 10. Stability and reactivity

<b>Reactive Hazard</b>	None known, based on information available
<b>Stability</b>	Light sensitive.
<b>Conditions to Avoid</b>	Incompatible products. Excess heat. Exposure to light. Exposure to moist air or water.
<b>Incompatible Materials</b>	Strong oxidizing agents, Strong bases, Amines, Alkali metals, Metals,
<b>Hazardous Decomposition Products</b>	Hydrogen chloride gas, Chlorine, Phosgene, Carbon monoxide (CO), Carbon dioxide (CO <sub>2</sub> )
<b>Hazardous Polymerization</b>	Hazardous polymerization does not occur.
<b>Hazardous Reactions</b>	None under normal processing.

## 11. Toxicological information

### Acute Toxicity

#### Product Information Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Trichloroethylene	LD50 = 4290 mg/kg ( Rat ) LD50 = 4920 mg/kg ( Rat )	LD50 > 20 g/kg ( Rabbit ) LD50 = 29000 mg/kg ( Rabbit )	LC50 = 26 mg/L ( 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
Trichloroethylene	79-01-6	Group 1	Reasonably Anticipated	A2	X	Not listed

*IARC: (International Agency for Research on Cancer)*

*NTP: (National Toxicity Program)*

*ACGIH: (American Conference of Governmental Industrial Hygienists)*

*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)*

*Known - Known Carcinogen*

*Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen*

*A1 - Known Human Carcinogen*

*A2 - Suspected Human Carcinogen*

*A3 - Animal Carcinogen*

*ACGIH: (American Conference of Governmental Industrial Hygienists)*

**Mutagenic Effects** Mutagenic effects have occurred in humans.

**Reproductive Effects** No information available.

**Developmental Effects** No information available.

**Teratogenicity** No information available.



<b>STOT - single exposure</b>	Central nervous system (CNS)
<b>STOT - repeated exposure</b>	Kidney Liver Heart spleen Blood
<b>Aspiration hazard</b>	No information available
<b>Symptoms / effects, both acute and delayed</b>	Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting: 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
<b>Endocrine Disruptor Information</b>	No information available
<b>Other Adverse Effects</b>	The toxicological properties have not been fully investigated.

## 12. Ecological information

### Ecotoxicity

Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Do not empty into drains. The product contains following substances which are hazardous for the environment. Contains a substance which is: Harmful to aquatic organisms. Toxic to aquatic organisms.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Trichloroethylene	EC50: = 175 mg/L, 96h (Pseudokirchneriella subcapitata) EC50: = 450 mg/L, 96h (Desmodesmus subspicatus)	LC50: 39 - 54 mg/L, 96h static (Lepomis macrochirus) LC50: 31.4 - 71.8 mg/L, 96h flow-through (Pimephales promelas)	EC50 = 0.81 mg/L 24 h EC50 = 115 mg/L 10 min EC50 = 190 mg/L 15 min EC50 = 235 mg/L 24 h EC50 = 410 mg/L 24 h EC50 = 975 mg/L 5 min	EC50: = 2.2 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
Trichloroethylene	2.4

## 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
Trichloroethylene - 79-01-6	U228	-

## 14. Transport information

### DOT

<b>UN-No</b>	UN1710
<b>Proper Shipping Name</b>	TRICHLOROETHYLENE
<b>Hazard Class</b>	6.1
<b>Packing Group</b>	III

### TDG

<b>UN-No</b>	UN1710
<b>Proper Shipping Name</b>	TRICHLOROETHYLENE
<b>Hazard Class</b>	6.1
<b>Packing Group</b>	III

### IATA

<b>UN-No</b>	UN1710
<b>Proper Shipping Name</b>	TRICHLOROETHYLENE

Hazard Class	6.1
Packing Group	III
<b>IMDG/IMO</b>	
UN-No	UN1710
Proper Shipping Name	TRICHLOROETHYLENE
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
Trichloroethylene	X	X	-	201-167-4	-		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

Component	TSCA 12(b)
Trichloroethylene	Section 5

#### SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Trichloroethylene	79-01-6	100	0.1

#### 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
Trichloroethylene	X	100 lb	X	X

#### Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Trichloroethylene	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
Trichloroethylene	100 lb 1 lb	-

**California Proposition 65** This product contains the following proposition 65 chemicals

Component	CAS-No	California Prop. 65	Prop 65 NSRL	Category
Trichloroethylene	79-01-6	Carcinogen Developmental Male Reproductive	14 µg/day 50 µg/day	Developmental Carcinogen

**U.S. State Right-to-Know Regulations**

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Trichloroethylene	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

**16. Other information**

**Prepared By** Regulatory Affairs  
Thermo Fisher Scientific  
Email: EMSDS.RA@thermofisher.com

**Creation Date** 03-Feb-2010

**Revision Date** 14-Jul-2016

**Print Date** 14-Jul-2016

**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

## Vinyl Chloride

### Section 1. Identification

<b>GHS product identifier</b>	: Vinyl Chloride
<b>Chemical name</b>	: vinyl chloride
<b>Other means of identification</b>	: chloroethylene; Ethene, chloro-; Chloroethene; Vinyl chloride, monomer; Ethene, chloro- (vinyl chloride); Vinyl chloride monomer; Monochloroethylene; Monochloroethene; Ethylene monochloride; VCM; VC
<b>Product type</b>	: Gas.
<b>Product use</b>	: Synthetic/Analytical chemistry.
<b>Synonym</b>	: chloroethylene; Ethene, chloro-; Chloroethene; Vinyl chloride, monomer; Ethene, chloro- (vinyl chloride); Vinyl chloride monomer; Monochloroethylene; Monochloroethene; Ethylene monochloride; VCM; VC
<b>SDS #</b>	: 001067
<b>Supplier's details</b>	: Airgas USA, LLC and its affiliates 259 North Radnor-Chester Road Suite 100 Radnor, PA 19087-5283 1-610-687-5253
<b>24-hour telephone</b>	: 1-866-734-3438

### Section 2. Hazards identification

<b>OSHA/HCS status</b>	: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
<b>Classification of the substance or mixture</b>	: FLAMMABLE GASES - Category 1 GASES UNDER PRESSURE - Liquefied gas CARCINOGENICITY - Category 1 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (liver) - Category 2

#### GHS label elements

##### **Hazard pictograms**



##### **Signal word**

##### **Hazard statements**

- : Danger
- : Extremely flammable gas.  
May form explosive mixtures with air.  
Contains gas under pressure; may explode if heated.  
May cause frostbite  
May displace oxygen and cause rapid suffocation.  
May cause cancer.  
May cause damage to organs through prolonged or repeated exposure. (liver)

#### 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. Approach suspected leak area with caution.

##### **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. Do not breathe gas.

## Section 2. Hazards identification

<b>Response</b>	: Get medical attention if you feel unwell. IF exposed or concerned: Get medical attention. Leaking gas fire: Do not extinguish, unless leak can be stopped safely. Eliminate all ignition sources if safe to do so.
<b>Storage</b>	: Store locked up. Protect from sunlight. Store in a well-ventilated place.
<b>Disposal</b>	: Dispose of contents and container in accordance with all local, regional, national and international regulations.
<b>Hazards not otherwise classified</b>	: 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

<b>Substance/mixture</b>	: Substance
<b>Chemical name</b>	: vinyl chloride
<b>Other means of identification</b>	: chloroethylene; Ethene, chloro-; Chloroethene; Vinyl chloride, monomer; Ethene, chloro- (vinyl chloride); Vinyl chloride monomer; Monochloroethylene; Monochloroethene; Ethylene monochloride; VCM; VC
<b>Product code</b>	: 001067

### CAS number/other identifiers

**CAS number** : 75-01-4

<b>Ingredient name</b>	<b>%</b>	<b>CAS number</b>
vinyl chloride	100	75-01-4

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

<b>Eye contact</b>	: 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.
<b>Inhalation</b>	: 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.
<b>Skin contact</b>	: Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. To avoid the risk of static discharges and gas ignition, soak contaminated clothing thoroughly with water before removing it. Continue to rinse for at least 10 minutes. Get medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse.
<b>Ingestion</b>	: As this product is a gas, refer to the inhalation section.

### Most important symptoms/effects, acute and delayed

#### Potential acute health effects

<b>Eye contact</b>	: No known significant effects or critical hazards.
<b>Inhalation</b>	: No known significant effects or critical hazards.
<b>Skin contact</b>	: No known significant effects or critical hazards.
<b>Frostbite</b>	: Try to warm up the frozen tissues and seek medical attention.
<b>Ingestion</b>	: As this product is a gas, refer to the inhalation section.

#### Over-exposure signs/symptoms

## Section 4. First aid measures

<b>Eye contact</b>	: No specific data.
<b>Inhalation</b>	: No specific data.
<b>Skin contact</b>	: No specific data.
<b>Ingestion</b>	: No specific data.

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

<b>Notes to physician</b>	: Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
<b>Specific treatments</b>	: No specific treatment.
<b>Protection of first-aiders</b>	: 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)

## Section 5. Fire-fighting measures

### Extinguishing media

<b>Suitable extinguishing media</b>	: Use an extinguishing agent suitable for the surrounding fire.
<b>Unsuitable extinguishing media</b>	: None known.

<b>Specific hazards arising from the chemical</b>	: Contains gas under pressure. Extremely flammable gas. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion.
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<b>Hazardous thermal decomposition products</b>	: Decomposition products may include the following materials: carbon dioxide carbon monoxide halogenated compounds
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<b>Special protective actions for fire-fighters</b>	: 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. If involved in fire, shut off flow immediately if it can be done without risk. If this is impossible, withdraw from area and allow fire to burn. Fight fire from protected location or maximum possible distance. Eliminate all ignition sources if safe to do so.
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<b>Special protective equipment for fire-fighters</b>	: Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
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## Section 6. Accidental release measures

### Personal precautions, protective equipment and emergency procedures

<b>For non-emergency personnel</b>	: Accidental releases pose a serious fire or explosion hazard. No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
<b>For emergency responders</b>	: 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** : 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. Use spark-proof tools and explosion-proof equipment.
- Large spill** : Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment. 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. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. 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.

Use only non-sparking tools. Empty containers retain product residue and can be hazardous. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Do not breathe gas. Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood.

**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). Eliminate all ignition sources. 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). Store locked up. 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
vinyl chloride	<b>ACGIH TLV (United States, 3/2017).</b> TWA: 1 ppm 8 hours. <b>OSHA PEL (United States, 6/2016).</b> STEL: 5 ppm 15 minutes. TWA: 1 ppm 8 hours. <b>OSHA PEL 1989 (United States, 3/1989).</b> STEL: 5 ppm 15 minutes. TWA: 1 ppm 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.



## Section 8. Exposure controls/personal protection

**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. 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** : 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. [COLORLESS GAS OR LIQUID (BELOW 7 F) WITH A PLEASANT ODOR AT HIGH CONCENTRATIONS. [NOTE: SHIPPED AS A LIQUEFIED COMPRESSED GAS.]
- Color** : Colorless.
- Odor** : Characteristic.
- Odor threshold** : Not available.
- pH** : Not available.
- Melting point** : -153.8°C (-244.8°F)
- Boiling point** : -13.4°C (7.9°F)
- Critical temperature** : 158.45°C (317.2°F)
- Flash point** : Closed cup: -78°C (-108.4°F)  
Open cup: -78°C (-108.4°F)
- Evaporation rate** : Not available.
- Flammability (solid, gas)** : Not available.
- Lower and upper explosive (flammable) limits** : Lower: 3.8%  
Upper: 29.3%



## Section 9. Physical and chemical properties

<b>Vapor pressure</b>	: Not available.
<b>Vapor density</b>	: 2.2 (Air = 1)
<b>Specific Volume (ft<sup>3</sup>/lb)</b>	: 6.25
<b>Gas Density (lb/ft<sup>3</sup>)</b>	: 0.16129 (21.1°C / 70 to °F)
<b>Relative density</b>	: Not applicable.
<b>Solubility</b>	: Not available.
<b>Solubility in water</b>	: 1.1 g/l
<b>Partition coefficient: n-octanol/water</b>	: 1.38
<b>Auto-ignition temperature</b>	: 472°C (881.6°F)
<b>Decomposition temperature</b>	: Not available.
<b>Viscosity</b>	: Not applicable.
<b>Flow time (ISO 2431)</b>	: Not available.
<b>Molecular weight</b>	: 62.5 g/mole
<b><u>Aerosol product</u></b>	
<b>Heat of combustion</b>	: -18924336 J/kg

## Section 10. Stability and reactivity

<b>Reactivity</b>	: No specific test data related to reactivity available for this product or its ingredients.
<b>Chemical stability</b>	: The product is stable.
<b>Possibility of hazardous reactions</b>	: Under normal conditions of storage and use, hazardous reactions will not occur.
<b>Conditions to avoid</b>	: 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.
<b>Incompatible materials</b>	: Oxidizers
<b>Hazardous decomposition products</b>	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.
<b>Hazardous polymerization</b>	: 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.

## Section 11. Toxicological information

### Classification

Product/ingredient name	OSHA	IARC	NTP
vinyl chloride	+	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
vinyl chloride	Category 2	Not determined	liver

### Aspiration hazard

Not available.

**Information on the likely routes of exposure** : Not available.

### Potential acute health effects

**Eye contact** : No known significant effects or critical hazards.  
**Inhalation** : No known significant effects or critical hazards.  
**Skin contact** : No known significant effects or critical hazards.  
**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** : May cause damage to organs through prolonged or repeated exposure.  
**Carcinogenicity** : May cause cancer. Risk of cancer depends on duration and level of exposure.  
**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.

## Section 11. Toxicological information

### [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 <sub>ow</sub>	BCF	Potential
vinyl chloride	1.38	-	low

### [Mobility in soil](#)

**Soil/water partition coefficient (K<sub>oc</sub>)** : 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.






### [United States - RCRA Toxic hazardous waste "U" List](#)

Ingredient	CAS #	Status	Reference number
Vinyl chloride; Ethene, chloro-	75-01-4	Listed	U043

## Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
<b>UN number</b>	UN1086	UN1086	UN1086	UN1086	UN1086
<b>UN proper shipping name</b>	VINYL CHLORIDE, STABILIZED	VINYL CHLORIDE, STABILIZED	VINYL CHLORIDE, STABILIZED	VINYL CHLORIDE, STABILIZED	VINYL CHLORIDE, STABILIZED

## Section 14. Transport information

Transport hazard class(es)	2.1 	2.1 	2.1 	2.1 	2.1 
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

#### DOT Classification

: **Reportable quantity** 1 lbs / 0.454 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.

**Quantity limitation** Passenger aircraft/rail: Forbidden. Cargo aircraft: 150 kg.

**Special provisions** 21, B44, T50

#### 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

**ERAP Index** 3000

**Passenger Carrying Road or Rail Index** Forbidden

#### IATA

: **Quantity limitation** Passenger and Cargo Aircraft: Forbidden. Cargo Aircraft Only: 150 kg.

**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 and the IBC Code** : Not available.

## Section 15. Regulatory information

**U.S. Federal regulations** : **TSCA 8(a) CDR Exempt/Partial exemption:** Not determined  
**Clean Water Act (CWA) 307:** vinyl chloride  
**Clean Air Act (CAA) 112 regulated flammable substances:** vinyl chloride

**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.

## Section 15. Regulatory information

### SARA 311/312

**Classification** : Refer to Section 2: Hazards Identification of this SDS for classification of substance.

### SARA 313

	Product name	CAS number	%
Form R - Reporting requirements	vinyl chloride	75-01-4	100
Supplier notification	vinyl chloride	75-01-4	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 can expose you to Vinyl chloride, which is known to the State of California to cause cancer. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

Ingredient name	No significant risk level	Maximum acceptable dosage level
Vinyl chloride	Yes.	-

### International regulations

#### Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

#### Montreal Protocol (Annexes A, B, C, E)

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

<b>Australia</b>	: This material is listed or exempted.
<b>Canada</b>	: This material is listed or exempted.
<b>China</b>	: This material is listed or exempted.
<b>Europe</b>	: This material is listed or exempted.
<b>Japan</b>	: <b>Japan inventory (ENCS):</b> This material is listed or exempted. <b>Japan inventory (ISHL):</b> This material is listed or exempted.
<b>Malaysia</b>	: This material is listed or exempted.
<b>New Zealand</b>	: This material is listed or exempted.
<b>Philippines</b>	: This material is listed or exempted.
<b>Republic of Korea</b>	: This material is listed or exempted.
<b>Taiwan</b>	: This material is listed or exempted.
<b>Thailand</b>	: Not determined.
<b>Turkey</b>	: This material is listed or exempted.

## Section 15. Regulatory information

<b>United States</b>	: This material is listed or exempted.
<b>Viet Nam</b>	: Not determined.

## Section 16. Other information

### Hazardous Material Information System (U.S.A.)

Health	*	2
Flammability		4
Physical hazards		2

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
FLAMMABLE GASES - Category 1	Expert judgment
GASES UNDER PRESSURE - Liquefied gas	Expert judgment
CARCINOGENICITY - Category 1	Expert judgment
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (liver) - Category 2	Expert judgment

### History

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<b>Version</b>	: 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 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
: UN = United Nations

## Section 16. Other information

**References** : Not available.

### 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.

## APPENDIX D





## **HEAT STRESS**

### **Heat Stress (Hyperthermia)**

Heat stress is the body's inability to regulate the core temperature. A worker's susceptibility to heat stress can vary according to his/her physical fitness, degree of acclimation to heat, humidity, age and diet.

1. Prior to site activity, the field team leader may make arrangements for heat stress monitoring (i.e., monitoring heart rate, body temperature, and body water loss) during actual site work if conditions warrant. In addition, the FTL is to ensure that each team member has been acclimatized to the prevailing environmental conditions, that personnel are aware of the signs and symptoms of heat sickness, that they have been adequately trained in first aid procedures, and that there are enough personnel on-site to rotate work assignments and schedule work during hours of reduced temperatures. Personnel should not consume alcoholic or caffeinated beverages but rather drink moderate levels of an electrolyte solution and eat well prior to commencing site work.
2. Although there is no specific test given during a baseline physical that would identify a person's intolerance to heat, some indicators are tobacco or medication use, dietary habits, body weight, and chronic conditions such as high blood pressure or diabetes.
3. *Heat cramps*, caused by profuse perspiration with inadequate fluid intake and salt replacement, most often afflict people in good physical condition who work in high temperature and humidity. Heat cramps usually come on suddenly during vigorous activity. Untreated, heat cramps may progress rapidly to heat exhaustion or heat stroke. First aid treatment: remove victim to a cool place and replace lost fluids with water.
4. Thirst is not an adequate indicator of heat exposure. Drinking fluid by itself does not indicate sufficient water replacement during heat exposure. A general rule, the amount of water administered should replace the amount of water lost, and it should be administered at regular intervals throughout the day. For every half pound of water lost, 8 ounces of water should be ingested. Water should be replaced by drinking 2 – 4 ounce servings during every rest period. A recommended alternative to water is an electrolyte drink split 50/50 with water.

5. *Heat exhaustion* results from salt and water loss along with peripheral pooling of blood. Like heat cramps, heat exhaustion tends to occur in persons in good physical health who are working in high temperatures and humidity. Heat exhaustion may come on suddenly as dizziness and collapse. Untreated, heat exhaustion may progress to heat stroke.
6. *Treatment for heat exhaustion:* Move the victim to a cool environment (e.g. air-conditioned room/car), lay victim down and fan him/her. If the air-conditioning is not available, remove the victim to a shaded area, remove shirt, and fan. If symptoms do not subside within an hour, notify 911 to transport to hospital.
7. *Heat stroke* results from the body's inability to dissipate excess heat. A true medical emergency that requires immediate care, it usually occurs when one ignores the signs of heat exhaustion and continues strenuous activities. Working when the relative humidity exceeds 60% is a particular problem. Workers in the early phase of heat stress may not be coherent of they will be confused, delirious or comatose. Changes in behavior, irritability and combativeness are useful early signs of heat stroke.
8. *Treatment of heat stroke:* Move the victim to a cool, air-conditioned environment. Place victim in a semi-reclined position with head elevated and strip to underclothing. Cool victim as rapidly as possible, applying ice packs to the arms and legs and massaging the neck and torso. Spray victim with tepid water and constantly fan to promote evaporation. Notify 911 to transport to hospital as soon as possible.

**TABLE 1**

**SYMPTOMS OF HEAT STRESS**

*Heat cramps* are caused by heavy sweating with inadequate fluid intake. Symptoms include;

- Muscle cramps
- Cramps in the hands, legs, feet and abdomen

*Heat exhaustion* occurs when body organs attempt to keep the body cool. Symptoms include;

- |                                  |                    |
|----------------------------------|--------------------|
| • Pale, cool moist skin          | • Rapid heart rate |
| • Core temperature elevated 1-2° | • Heavy sweating   |
| • Thirst                         | • Dizziness        |
| • Anxiety                        | • Nausea           |

*Heat stroke* is the most serious form of heat stress. Immediate action must be taken to cool the body before serious injury and death occur. Symptoms are;

- Red, hot, dry skin
- Lack of perspiration
- Seizures
- Dizziness and confusion
- Strong, rapid pulse
- Core temperature of 104° or above
- Coma

**TABLE 2**

**HEAT STRESS INDICATORS**

<b>Heat stress indicator</b>	<b>When to measure</b>	<b>If Exceeds...</b>	<b>Action</b>
Heart rate (pulse)	Beginning of rest period	110 beats per minute	Shorten next work period by 33%
Oral temperature	Beginning of rest period	99°F (after thermometer is under tongue for 3 minutes)	Shorten next work period by 33%
		100.6°F	Prohibit work in impermeable clothing
Body weight	1. Before workday begins (a.m.) 2. After workday ends (p.m.)		Increase fluid intake

## **COLD STRESS**

### **Cold stress (Hypothermia)**

In hypothermia the core body temperature drops below 95°F. Hypothermia can be attributed to a decrease in heat production, increased heat loss or both.

### **Prevention**

Institute the following steps to prevent overexposure of workers to cold:

1. Maintain body core temperature at 98.6°F or above by encouraging workers to drink warm liquids during breaks (preferably not coffee) and wear several layers of clothing that can keep the body warm even when the clothing is wet.
2. Avoid frostbite by adequately covering hands, feet and other extremities. Clothing such as insulated gloves or mittens, earmuffs and hat liners should be worn. To prevent contact frostbite (from touching metal and cold surfaces below 20°F), workers should wear gloves. Tool handles should be covered with insulating material.
3. Adjust work schedules to provide adequate rest periods. When feasible, rotate personnel and perform work during the warmer hours of the day.
4. Provide heated shelter. Workers should remove their outer layer(s) of clothing while in the shelter to allow sweat to evaporate.
5. In the event that wind barriers are constructed around an intrusive operation (such as drilling), the enclosure must be properly vented to prevent the buildup of toxic or explosive gases or vapors. Care must be taken to keep a heat source away from flammable substances.
6. Using a wind chill chart such as the one in Table 3, obtain the equivalent chill temperature (ECT) based on actual wind speed and temperature. Refer to the ECT when setting up work warm-up schedules, planning appropriate clothing, etc. Workers should use warming shelters at regular intervals at or below an ECT of 20°F. For exposed skin, continuous exposure should not be permitted at or below an ECT of -25°F.

### **Frostbite**

Personnel should be aware of symptoms of frostbite/hypothermia. If the following symptoms are noticed in any worker, he/she should immediately go to a warm shelter.

Condition	Skin Surface	Tissue Under Skin	Skin Color
Frostnip	Soft	Soft	Initially red, then white
Frostbite	Hard	Soft	White and waxy
Freezing	Hard	Hard	Blotchy, white to yellow-gray to gray

1. *Frostnip* is the incipient stage of frostbite, brought about by direct contact with a cold object or exposure of a body part to cool/cold air. Wind chill or cold water also can be major factors. This condition is not serious. Tissue damage is minor and the response to care is good. The tip of the nose, tips of ears, upper cheeks and fingers (all areas generally exposed) are most susceptible to frostnip.
2. *Treatment of frostnip*: Care for frostnip by warming affected areas. Usually the worker can apply warmth from his/her bare hands, blow warm air on the site, or, if the fingers are involved, hold them in the armpits. During recovery, the worker may complain of tingling or burning sensation, which is normal. If the condition does not respond to this simple care, begin treatment for frostbite.
3. *Frostbite*: The skin and subcutaneous layers become involved. If frostnip goes untreated, it becomes superficial frostbite. This condition is serious. Tissue damage may be serious. The worker must be transported to a medical facility for evaluation. The tip of the nose, tips of ears, upper cheeks and fingers (all areas generally exposed) are most susceptible to frostbite. The affected area will feel frozen, but only on the surface. The tissue below the surface must still be soft and have normal response to touch. **DO NOT** squeeze or poke the tissue. The condition of the deeper tissues can be determined by gently palpating the affected area. The skin will turn mottled or blotchy. It may also be white and then turn grayish-yellow.
4. *Treatment of frostbite*: When practical, transport victim as soon as possible. Get the worker inside and keep him/her warm. Do not allow any smoking or alcohol consumption. Thaw frozen parts by immersion, re-warming in a 100°F to 106°F water bath. Water temperature will drop rapidly, requiring additional warm water throughout the process. Cover the thawed part with a dry sterile dressing. Do not puncture or drain any blisters.

**NOTE:** Never listen to myths and folk tales about the care of frostbite. *Never* rub a frostbitten or frozen area. *Never* rub snow on a frostbitten or frozen area. Rubbing the area may cause

serious damage to already injured tissues. Do not attempt to thaw a frozen area if there is any chance it will be re-frozen.

5. *General cooling/Hypothermia:* General cooling of the body is known as systemic hypothermia. This condition is not a common problem unless workers are exposed to cold for prolonged periods of time without any shelter.

Body Temperature	°C	Symptoms
99-96	37-35.5	Intense, uncontrollable shivering
95-91	35.5-32.7	Violent shivering persists. If victim is conscious, he has difficulty speaking.
90-86	32-30	Shivering decreases and is replaced by strong muscular rigidity. Muscle coordination is affected. Erratic or jerkey movements are produced. Thinking is less clear. General comprehension is dulled. There may be total amnesia. The worker is generally still able to maintain the appearance of psychological contact with his surroundings.
85-81	29.4-27.2	Victim becomes irrational, loses contact with his environment, and drifts into a stuporous state. Muscular rigidity continues. Pulse and respirations are slow and the worker may develop cardiac arrhythmias.
80-78	26.6-18.5	Victim becomes unconscious. He does not respond to the spoken word. Most reflexes cease to function. Heartbeat becomes erratic
Below 78	25.5	Cardiac and respiratory centers of the brain fail. Ventricular fibrillation occurs; probably edema and hemorrhage in the lungs; death.

6. *Treatment of hypothermia:* Keep worker dry. Remove any wet clothing and replace with dry clothes, or wrap person in dry blankets. Keep person at rest. Do not allow him/her to move around. Transport the victim to a medical facility as soon as possible.

**TABLE 3<sup>(1)</sup>**  
**COOLING POWER OF WIND ON EXPOSED FLESH EXPRESSED**  
**AS AN EQUIVALENT TEMPERATURE (UNDER CALM CONDITIONS)**

Estimated wind Speed (in mph)	Actual Temperature Reading (°F)P											
	50	40	30	20	10	0	10	20	30	40	50	60
	Equivalent Chill Temperature (°F)											
Calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	15	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-146
(Wind speeds greater than 40 mph have little additional effect.)	LITTLE DANGER in < hr with dry skin. Maximum danger of false sense of security.			INCREASING DANGER Danger from freezing of exposed flesh within one minute				GREAT DANGER may freeze within 30 seconds.				Flesh
	Trench foot and immersion foot may occur at any point on this chart											

Developed by U.S. Army Research Institute of Environmental Medicine, Natick, MA.

(1) Reproduced from American Conference of Governmental Industrial Hygienists, Threshold Limit Values and Biological Exposure Indices for 1985-1986, p.01.



## APPENDIX E





## FIELD ACCIDENT REPORT

This report is to be filled out by the designated Site Safety Officer after EVERY accident.

PROJECT NAME: \_\_\_\_\_ PROJECT. NO.: \_\_\_\_\_

Date of Accident: \_\_\_\_\_ Time: \_\_\_\_\_ Report By: \_\_\_\_\_

Type of Accident (Check One):

( ) Vehicular      ( ) Personal      ( ) Property

Name of Injured: \_\_\_\_\_ DOB or Age \_\_\_\_\_

How Long Employed: \_\_\_\_\_

Names of Witnesses: \_\_\_\_\_

Description of Accident: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Action Taken: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Did the Injured Lose Any Time? \_\_\_\_\_ How Much (Days/Hrs.)? \_\_\_\_\_

Was Safety Equipment in Use at the Time of the Accident (Hard Hat, Safety Glasses, Gloves, Safety Shoes, etc.)? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

(If not, it is the EMPLOYEE'S sole responsibility to process his/her claims through his/her Health and Welfare Fund.)

INDICATE STREET NAMES, DESCRIPTION OF VEHICLES, AND NORTH ARROW

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## **APPENDIX H**

### **COMMUNITY AIR MONITORING PLAN**

**ATLANTIC AVENUE PROPERTIES  
1045, 1053, 1057, 1059 AND 1065 ATLANTIC AVE  
BROOKLYN, NEW YORK  
SITE #C224305**

## Community Air Monitoring Plan

Submitted To:



New York State Department of Environmental Conservation  
Division of Environmental Remediation  
47-20 21<sup>st</sup> Street  
Long Island City, NY 11101

Prepared For:

1065 Atlantic Brooklyn, LLC  
7 Penn Plaza, Suite 600,  
New York, NY 10001

Prepared By:



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PWGC Project Number: TOT1903

**NOVEMBER 2024**

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## 1.0 INTRODUCTION

This Community Air Monitoring Plan (CAMP) provides measures for protection for on-site workers and the downwind community (i.e., off-site receptors including residences, businesses, and on-site workers not directly involved in the remedial investigation) from potential airborne contaminant releases resulting from remedial activities performed at 1045-1065 Atlantic Avenue, Brooklyn, New York.

The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that the remedial investigation or actions did not spread contamination off-site through the air.

Based on previous investigations at the site, the primary concerns for this site are VOCs and dust particulates.

## 2.0 REGULATORY REQUIREMENTS

This CAMP was established in accordance with the following requirements:

- 29 CFR 1910.120(h): This regulation specifies that air shall be monitored to identify and quantify levels of airborne hazardous substances and health hazards, and to determine the appropriate level of protection for workers.
- New York State Department of Health's (NYSDOH) Generic Community Air Monitoring Plan: This guidance specifies that a community air-monitoring program shall be implemented to protect the surrounding community and to confirm that the work does not spread contamination off-site through the air.
- New York State Department of Environmental Conservation (NYSDEC) Division of Environmental Remediation (DER)-10, Appendix 1B – Fugitive Dust and Particulate Monitoring. This guidance provides a basis for developing and implementing a fugitive dust suppression and particulate monitoring program as an element of a site's health and safety program.

### 3.0 AIR MONITORING

The following sections contain information describing the types, frequency and location of real-time monitoring.

This section addresses the real-time monitoring that will be conducted within the work area, and along the site perimeter, during intrusive activities such as excavation, product recovery, manipulation of soil piles, extraction of sheet piling, etc.

#### 3.1 Volatile-Organic Vapor Monitoring, Response-Levels, and Actions

Volatile organic vapors will be monitored at the downwind perimeter of the immediate work area on a continuous basis during invasive work. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work will be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment will be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 ppm above background for the 15-minute average, work activities will be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities will resume with continued monitoring.
- If total organic vapor levels at the downwind perimeter of the work area persist at levels in excess of 5 ppm over 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 200 feet downwind of the work area 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.
- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be shutdown.

Time-weighted 15-minute readings will be recorded and be available for NYSDEC personnel to review. Instantaneous readings, if any, used for decision purposes will also be recorded.



### 3.2 Particulate Monitoring, Response-Levels, and Actions

Particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the work area at temporary particulate monitoring stations. The particulate monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of calculating 15-minute running average concentrations for comparison to the airborne particulate action level. The equipment will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work will continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150  $\mu\text{g}/\text{m}^3$  above the upwind level and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150  $\mu\text{g}/\text{m}^3$  above the upwind level, work will be stopped, and a re-evaluation of activities initiated. Work will resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150  $\mu\text{g}/\text{m}^3$  of the upwind level and in preventing visible dust migration.

Readings will be recorded and be available for NYSDEC personnel to review.

### 3.3 Odor and Dust Control

#### 3.3.1 Odor Control

Necessary means will be employed to prevent on and offsite odor nuisances. At a minimum, procedures will include: (a) limiting the area of open excavations; (b) shrouding open excavations with tarps and other covers; and (c) use of foams to cover exposed odorous soils. If odors develop and cannot otherwise be controlled, additional means to eliminate odor nuisances will include: (d) use of chemical odorants in spray or misting systems.

This odor control plan is capable of controlling emissions of nuisance odors. If nuisance odors are identified, work will be halted, and the source of odors will be identified and corrected. Work will not resume until nuisance odors have been abated. NYSDEC will be notified of odor complaint events. Implementation of odor controls will be the responsibility of the contractor.

### 3.3.2 *Dust Control*

Dust management during invasive on-site work will include, at a minimum:

- Use of a dedicated water spray methodology for roads, excavation areas and stockpiles.
- Exercise extra care during dry and high-wind periods.
- Use of gravel or RCA on egress and other roadways to provide a clean and dust-free road surface.

This dust control plan is capable of controlling emissions of dust. If nuisance dust emissions are identified, work will be halted, and the source of dusts will be identified and corrected. Work will not resume until nuisance dust emissions have been abated. NYSDEC will be notified of dust complaint events. Implementation of dust controls will be the responsibility of the contractor.

#### **4.0 RECORD KEEPING**

Copies of the CAMP monitoring logs for VOCs and dust particulates will be provided in the applicable report documenting the work activities conducted. In the event that odor or dust suppression techniques were required, they will also be documented in the report.

## **APPENDIX I**

### **REMEDIAL AND MITIGATION SYSTEM AIR DISCHARGE ANALYSIS**

TOT 2201  
1057 Atlantic Ave.  
Brooklyn, NY 11238

ACTIVE SYSTEM

TOT2201 - 1057 Atlantic Avenue Brooklyn, NY 11238

Contaminant	CAS #	Mol Weight (g)	Soil Vapor Sampling Results (ug/m³)	Emission Rates				DAR-1 Guideline Concentrations			
				Active (AERSCREEN Input)		Est. Ambient Air Conc. (µg/m³) Short-term²	Est. Ambient Air Conc. (µg/m³) Annual²	SGC (µg/m³)	AGC (µg/m³)		
				lbs/hour¹	lbs/year	Active System				Above air permitting thresholds?	g/s (for AERSCREEN data entry)
Tetrachloroethene	127-18-4	165.8	42200.00	6.436E-02	563.79	2.63E+00	2.63E-01	300	3.80E+00	NO	0.0081164
Trichloroethene	79-01-6	131.38	30511.45	4.653E-02	407.63	1.90E+00	1.90E-01	20	2.10E-01	NO	0.0058683
TOTAL VOC/HAP					971.42						

<sup>1</sup>Air Flow Rate (cfm): 400 based on Cincinnati Fan Model HP-8B18 - 240V, Direct Drive Arrangement 4 (Rated at 1,000 cfm / running at 400 cfm in conjunction with VFD).

<sup>2</sup>Estimated short-term (1-hr) and annual emission concentration calculated with AERSCREEN Screening Software.

<sup>3</sup>SCG/ACG - NYSDEC Division of Air Resources Short-term Guideline Concentration/Annual Guideline Concentration

Note: The contaminants of interest emission rates were run through AERSCREEN software for ambient air concentration values. Since they are well within NYSDEC Ambient Air Guidance Values, it is implied that the remaining contaminants also fall with permitted guidelines.

1 lb mole of ideal gas occupies 385.4 ft³ (rounded to 385)  
8.3144 = Ideal Gas Constant

Values in Shaded area:		8/19/21 sample
Values in Shaded area:		8/15/22 sample combined

Hrly processing rate 24000 cfh  
Annual processing rate 210,240,000 cfy

$$ppbV = \frac{\mu g}{m^3} \times \frac{1}{Molecular\ Weight_{contaminant} [g/mole]} \times 8.3144 \left[ \frac{L \cdot kPa}{mol \cdot K} \right] \times T_{air} [K] \times \frac{1}{P_{air} [kPa]}$$

SAMPLE ID	TCE SAMPLE RESULT ug/m³
SV011	6030
SV012	1750
SV013	15300
SV014	13100
SV015	194000
SV016	99900
SV017	2390
SV018	2090
SS008	508
SS012	269
SS013	289
AVERAGE	30511.45

## **APPENDIX J**

### **QUALITY ASSURANCE PROJECT PLAN**

1045-1065 ATLANTIC AVENUE  
BROOKLYN, NEW YORK 11238  
NYSDEC BCP SITE: C224305  
BLOCK: 2020, LOT: 8

## SITE MANAGEMENT PLAN QUALITY ASSURANCE PROJECT PLAN

**SUBMITTED TO:**



New York State Department of Environmental Conservation  
Division of Environmental Remediation  
625 Broadway  
Albany, New York 12233

**ON BEHALF OF:**

1065 Atlantic Brooklyn Avenue LLC.  
7 Penn Plaza, Suite 600  
New York, New York 10001

**PREPARED BY:**



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PWGC Project Number: TOT2201

NOVEMBER 2024



1045-1065 ATLANTIC AVENUE, BROOKLYN, NEW YORK  
NYSDEC BCP ID C224305  
QUALITY ASSURANCE PROJECT PLAN

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## **APPENDICIES**

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## 1.0 INTRODUCTION

P.W. Grosser Consulting Engineer & Hydrogeologist, PC (PWGC) has prepared this Quality Assurance Project Plan (QAPP) for post-remedial activities to be undertaken at the property located at 1045-1065 Atlantic Avenue in Brooklyn, New York if necessary. This QAPP has been prepared to define the quality assurance (QA) and quality control (QC) measures to be implemented, to verify the integrity of the work to be performed at the site, and that the data collected will be of the appropriate type and quality needed for the intended use. Specifically, this QAPP addresses the following:

- Description of Project
- Organization and Responsibilities of Project Personnel
- Project Objectives, including Quality Assurance Objectives for Data
- Overview of Field Sampling Program and Procedures
- Sample Packaging and Shipping
- Sample Documentation
- Sample Analytical Program
- Quality Assurance/Quality Control Procedures

Post remedial activities, as specified in the Site Management Plan (SMP), for the site will include:

- Soil vapor and/or ambient air sampling.

And may potentially include:

- Soil sampling.
- Groundwater sampling.

Currently, the site is equipped with a soil vapor extraction (SVE) system and sub-slab depressurization system (SSDS) and air/vapor sampling will be a feature in the long-term monitoring and maintenance of these items. Soil and groundwater sampling is not anticipated; however, breaches of the site cover system, if performed, may include the collection of soil and groundwater sampling.





## 2.0 PROJECT ORGANIZATION AND PERSONNEL RESPONSIBILITIES

The monitoring efforts defined in the Site Management Plan (SMP) will be coordinated by PWGC on behalf of 1065 Atlantic Brooklyn Avenue, LLC. The New York State Department of Environmental Conservation (NYSDEC) is the lead regulatory agency overseeing monitoring and inspections at the site. An organization structure has been developed to identify the roles and responsibilities of the various parties involved with the project, as discussed below.

The **NYSDEC Project Manager** will be responsible for reviewing and approving work plans and amendments, coordinating approval of requested modifications, and providing guidance on regulatory requirements. The current NYSDEC Project Manager for this Site is Ms. Jennifer Gonzalez.

The **Project Director** will provide technical expertise for review of the project plans, reports and ongoing field activities. The program manager will be responsible for the coordination of the overall post-BCP activities with the NYSDEC. The current project directors for this program will be Ms. Jennifer Lewis.

The **Quality Assurance Officer** will be responsible for the Communicates changes to QAPP to NYSDEC and determines need for field and analytical corrective actions. The current quality assurance manager for this project is Mr. Andrew Lockwood.

The **Project Manager** will be responsible for the day-to-day project management, task leadership, and project engineering support and for the implementation of the SMP. The Project Manager is responsible for ensuring that the requirements of the remediation are implemented. The project manager will also act as the site Health and Safety Manager (HSM). The Project Manager for this is currently Mr. Ryan Morley.

The **Field Team Leader** will be responsible for sample collection, oversight of subcontractor personnel, and coordination of field activities. The Field Team Leader will act as the Site Health and Safety Officer ensuring implementation of the Site Health and Safety Plan. The field team leader for this project is currently Mr. Andres Ballares.

Resumes for the Project Director, Quality Assurance Manager, Project Manager, and Field Team Leader are included in **Appendix Q-A**.





A NYSDOH Environmental Laboratory Accreditation Program (ELAP) certified laboratory will be contracted to perform required analyses and reporting, including Analytical Services Protocol (ASP) Category B Deliverables, which will allow for data validation. The following analytical laboratories are designated for this site:

- Alpha Analytical of Westborough, Massachusetts – ELAP #11148
- York Analytical Laboratories of Stratford, Connecticut – ELAP #10854 and 12058.

The following third-party data validator is designated for this site:

- Laboratory Data Consultants of Carlsbad, California (Company resume is included as **Appendix Q-B**).

Subcontractors will perform remedial construction, surveying, drilling, and/or sampling at the direction of the Field Team Leader in accordance with this work plan.



### 3.0 QUALITY ASSURANCE PROJECT OBJECTIVES

The objective of this QA/QC plan is to ensure proper and consistent inspection and sampling measures are performed during field activities during the continued monitoring phase for the duration of this SMP's lifespan.

#### 3.1 Data Quality Objective Process

Data quality objectives (DQOs) are qualitative and quantitative statements that specify the quality of the data required to support decisions during routine monitoring activities. DQOs can be defined as what the end user expects to obtain from the analysis results, and are developed through a seven-step process:

- Step 1 State the problem
- Step 2 Identify the decision
- Step 3 Identify inputs to the decision
- Step 4 Define the study boundaries
- Step 5 Develop a decision rule
- Step 6 Specify limits on decision errors
- Step 7 Optimize the decision for obtaining data

For the site, screening data generated by rapid, less precise methods of analysis (PID screening, collection of groundwater field parameters, etc.) will achieve a data use level for site characterization and monitoring. Definitive laboratory analytical data generated during endpoint soil sampling will achieve a data use level to support an assessment of the overall effectiveness of the site remedy. Specifically, these data will be used to:

- Monitor the residual gasoline spill impact in groundwater beneath the site.
- Monitor sub-slab soil vapor and indoor air quality, if the SSDS is activated.

#### 3.2 Data Quality Categories

DQOs are composed of written expectations for precision, accuracy, representativeness, completeness and comparability of a data set (see Section 3.3). The DQO process provides a logical basis for linking the QA/QC procedures to the intended use of the data, primarily through the decision maker's acceptable limits on decision error. Two descriptive data categories - screening data and definitive data - will be used for the site.

Screening data are generated by rapid, less precise methods of analysis and are deemed non-critical to project objectives. Portable instruments to be used during remedial action to collect screening data include:

- Photoionization detector (PID) or Flame ionization detector (FID)
- Aerosol/dust monitor





Definitive data are generated using specific analytical methods and guidelines and have satisfied known QA/QC requirements. Analytical data provided by an off-site laboratory shall be definitive data, and are deemed critical to project objectives. QA/QC elements of definitive data include determination and documentation of calibrations, detection limits, method blanks, and matrix spike recoveries.

### **3.3 QA/QC Characteristics**

The overall QA/QC objective for remediation monitoring activities is to develop and implement procedures that will provide data of known and documented quality. QA/QC characteristics for data include precision, accuracy, representativeness, completeness, and comparability (PARCC). Data quality objectives for each of these parameters are determined based on the level of data required. Descriptions of these characteristics are provided below, and specific QA objectives for both screening and definitive data are presented in Table 3-1. Analytical matrices and methods are provided on the table for analysis that is anticipated to be performed during the SMP phase of the project and for analysis that are not anticipated.



**Table 3-1  
Laboratory Methods**

**ANALYTICAL METHODS (SOIL)**

Analyte/ Analyte Group	Matrix	Method/ SOP	Container(s) (number, size & type per sample)	Preservation	Preparation Holding Time	Analytical Holding Time	Estimated Number of Samples to be Collected
TAL Metals	Soil	EPA 6010C	1 x 2 oz, glass	Metals ex	6 months	6 months	12 to 24
TCL VOCs	Soil	EPA 8260C	3 x 40 ml VOA, glass vial	1 x Methanol 2 x DI H <sub>2</sub> O Cool ≤ 6 °C	48 hours	14 Days	12 to 24
TCL SVOCs	Soil	EPA 8270D	1 x 8 oz, glass	Cool ≤ 6 °C	14 days	40 days	12 to 24
PCBs	Soil	EPA 8082A	1 x 8 oz, glass	Cool ≤ 6 °C	14 days	40 Days	12 to 24
Cyanide	Soil	EPA 9010C/9012B	1 x 250 ml, plastic	Cool ≤ 6 °C	14 days	14 days	12 to 24
PFAS	Soil	EPA 1633	1 x 8 oz, HDPE	None	14 days	28 days	12 to 24
*SIM Mode only necessary if EPA 8260 analysis cannot meet a MDL of 0.1 mg/kg							

**ANALYTICAL METHODS (SOIL VAPOR)**

Analyte/ Analyte Group	Matrix	Method/ SOP	Container(s) (number, size & type per sample)	Preservation	Preparation Holding Time	Analytical Holding Time	Estimated Number of Samples to be Collected
VOCs	Soil Vapor	USEPA TO-15	6L SUMMA Canister	None	None	30	5



### ANALYTICAL METHODS (GROUNDWATER)

Analyte/ Analyte Group	Matrix	Method/ SOP	Container(s) (number, size & type per sample)	Preservation	Preparation Holding Time	Analytical Holding Time	Estimated Number of Samples to be Collected
Metals	Water	EPA 6020A	1 x 500 ml plastic	HNO <sub>3</sub>	6 months	6 months	6
VOCs	Water	EPA 8260C	3 x 40 ml VOA, glass vial	HCl Cool ≤ 6 °C	48 hours	14 Days	6
SVOCs	Water	EPA 8270D	2 x 1000 ml, amber glass	Cool ≤ 6 °C	7 days	40 days	6
PCBs	Water	EPA 8082A	1 x 1000 ml, amber glass	Cool ≤ 6 °C	7 days	40 Days	6
Cyanide	Water	EPA 9010C/9012B	1 x 250 ml, plastic	NaOH	14 days	14 days	6
PFAS	Water	EPA 1633	3 x 250 ml HDPE, unlined cap	Trizma Cool < 6 °C	14 days	28 days	6
*SIM Mode to be used to meet required detection limit of 0.35 ug/L							

Laboratory MDLs and Reporting Limits (RLs) for PFAS analysis are detailed in the tables below:

### PFAS MDLs & RLs (SOIL)

Analyte	CAS Number	RL (µg/kg)	MDL (µg/kg)
Perfluorobutanoic Acid (PFBA)	375-22-4	0.5	0.0227
Perfluoropentanoic Acid (PFPeA)	2706-90-3	0.5	0.046
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	0.25	0.039
Perfluorohexanoic Acid (PFHxA)	307-24-4	0.5	0.0525
Perfluoroheptanoic Acid (PFHpA)	375-85-9	0.25	0.0451





Analyte	CAS Number	RL (µg/kg)	MDL (µg/kg)
Perfluorohexanesulfonic Acid (PFHxS)	355-46-4	0.25	0.0605
Perfluorooctanoic Acid (PFOA)	335-67-1	0.25	0.0419
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	27619-97-2	0.5	0.1795
Perfluoroheptanesulfonic Acid (PFHpS)	375-92-8	0.5	0.1365
Perfluorononanoic Acid (PFNA)	375-95-1	0.25	0.075
Perfluorooctanesulfonic Acid (PFOS)	1763-23-1	0.25	0.13
Perfluorodecanoic Acid (PFDA)	335-76-2	0.25	0.067
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	39108-34-4	0.5	0.287
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	2355-31-9	0.5	0.2015
Perfluoroundecanoic Acid (PFUnA)	2058-94-8	0.5	0.0468
Perfluorodecanesulfonic Acid (PFDS)	335-77-3	0.5	0.153
Perfluorooctanesulfonamide (FOSA)	754-91-6	0.5	0.098
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	2991-50-6	0.5	0.0845
Perfluorododecanoic Acid (PFDoA)	307-55-1	0.5	0.07
Perfluorotridecanoic Acid (PFTTrDA)	72629-94-8	0.5	0.2045
Perfluorotetradecanoic Acid (PFTA)	376-06-7	0.5	0.054
PFOA/PFOS, Total		0.5	0.04105

#### PFAS MDLs & RLs (GROUNDWATER)

Analyte	CAS Number	RL (ng/L)	MDL (ng/L)
Perfluorobutanoic Acid (PFBA)	375-22-4	2	0.408
Perfluoropentanoic Acid (PFPeA)	2706-90-3	2	0.396



Analyte	CAS Number	RL (ng/L)	MDL (ng/L)
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	2	0.238
Perfluorohexanoic Acid (PFHxA)	307-24-4	2	0.328
Perfluoroheptanoic Acid (PFHpA)	375-85-9	2	0.2252
Perfluorohexanesulfonic Acid (PFHxS)	355-46-4	2	0.376
Perfluorooctanoic Acid (PFOA)	335-67-1	2	0.236
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	27619-97-2	2	1.332
Perfluoroheptanesulfonic Acid (PFHpS)	375-92-8	2	0.688
Perfluorononanoic Acid (PFNA)	375-95-1	2	0.312
Perfluorooctanesulfonic Acid (PFOS)	1763-23-1	2	0.504
Perfluorodecanoic Acid (PFDA)	335-76-2	2	0.304
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	39108-34-4	2	1.212
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	2355-31-9	2	0.648
Perfluoroundecanoic Acid (PFUnA)	2058-94-8	2	0.26
Perfluorodecanesulfonic Acid (PFDS)	335-77-3	2	0.98
Perfluorooctanesulfonamide (FOSA)	754-91-6	2	0.58
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	2991-50-6	2	0.804
Perfluorododecanoic Acid (PFDoA)	307-55-1	2	0.372
Perfluorotridecanoic Acid (PFTTrDA)	72629-94-8	2	0.3272
Perfluorotetradecanoic Acid (PFTA)	376-06-7	2	0.248
PFOA/PFOS, Total		2	0.504





The laboratory standard operating procedures for PFAS analysis are included in Error! Reference source not found.Q-C.

For 1,4-dioxane in soil, the MDL is 7.6 µg/kg and the RL is 25 µg/kg. For 1,4-dioxane in groundwater, the MDL is 0.0339 µg/L and the RL is 0.150 µg/L.

Notes:

Abbreviations include:

%R = Percent Recovery

GC = Gas Chromatography

N/A = Not Applicable

NTU = Nephelometric Turbidity Units

TAL = Target Analyte List

TCL = Target Compound List

CRQL = Contract Required Quantitation Limit

MDL = Method Detection Limit

VOCs = Volatile Organic Compounds

RPD = Relative Percent Difference

\* Precision dependent on meter and scale.



**Precision** is the measurement of agreement in repeated tests of the same or identical samples, under prescribed conditions. Analytical precision can be expressed in terms of Standard Deviation (SD), Relative Standard Deviation (RSD) and/or Relative Percent Difference (RPD). The precision of analytical environmental samples has two components - laboratory precision and sampling precision. Laboratory precision is determined by replicate measurements of laboratory duplicates and by analysis of reference materials. The objectives for laboratory precision are specified in the analytical methodologies and are presented on Table 3-1. The precision of the field sampling effort is determined by the analysis of field duplicate samples. Field duplicate analysis will be performed at a rate of five percent (i.e., one duplicate collected for every 20 samples). Acceptance criteria for duplicates analyzed by an off-site laboratory shall be an RPD of 25 percent. The precision limits provided in Table 3-1 for the screening measurements are acceptance criteria for duplicate and calibration analyses of field measurement parameters.

**Accuracy** is the degree of agreement of a measured sample result or average of results with an accepted reference or true value. It is the quantitative measurement of the bias of a system, and is expressed in terms of percent recovery (%R). Measurements of accuracy for the laboratory include surrogate spike, laboratory control spike, matrix spike and matrix spike duplicate samples. The laboratory must meet or exceed control limit objectives, as stated in Table 3-1 and the applicable methodologies.

**Representativeness** is the degree to which the results of the analyses accurately and precisely represent a characteristic of a population, a process condition, or an environmental condition. In this case, representativeness is the degree to which the data reflect the contaminants present and their concentration magnitudes in the sampled site areas. Representativeness of data will be ensured through the selection of sampling locations and implementation of approved sampling procedures. Results from environmental field duplicate sample analyses can be used to assess representativeness, in addition to precision.

**Completeness** is defined as the percentage of samples that meet or exceed all the criteria objective levels for accuracy, precision and detection limits within a defined time period or event. It is the measure of the number of data "points" which are judged to be valid, usable results. The objective for completeness for this project is 90 percent, and will be calculated by dividing the number of usable data results (i.e., all results not considered to be "rejected" and all samples able to be analyzed) by the number of possible data results (i.e., the total number of field samples collected), and then multiplying by 100 percent.

**Comparability** is the degree of confidence with which results from two or more data sets, or two or more laboratories, may be compared. To achieve comparability, standard environmental methodologies will be employed in the field and in the laboratory. See Table 3-1 and Section 6.0 for analysis methods and detection limits for this field investigation.

### **3.4 Impact of Failure to Meet Data Quality Objectives**

The QA objectives presented in Table 3-1 represent the data quality necessary to meet the project's technical goals. The QA/QC efforts discussed in this QAPP focus on controlling measurement error, and ultimately providing a database for estimating the uncertainty in the measurement data for the project. QA objectives will be evaluated throughout the SMP monitoring effort to see if the results for the project meet the stated objectives. If these objectives are not being met, the precision and/or accuracy of the sampling data will be decreased, and corrective actions shall be taken, as documented in Section 13.0.

#### **4.0 SITE MANAGEMENT MONITORING ACTIVITIES**

This section provides an overview of the planned monitoring operations by matrix and type of procedures. It also includes activities that may be necessary in the future to supplement the existing groundwater monitoring well network (i.e., site survey; monitoring well installation, etc.). Field monitoring and sampling activities include the following:

- Mobilization and demobilization, if necessary.
- Waste Characterization, if necessary.
- Soil Excavation and Removal, if necessary.
- Monitoring well sampling.
- SSDS monitoring and sampling.

#### **4.1 SMP Monitoring Procedures**

SMP monitoring activities to be performed at the site will be conducted in accordance with established technical guidelines, methods, policies and Standard Operating Procedures (SOPs). The subsections below present an overview of the sampling program procedures; a more detailed discussion of the monitoring activities is presented in the SMP.

##### ***4.1.1 Mobilization and Demobilization***

If necessary, the mobilization effort will consist of logistical planning, identification of sampling locations, equipment mobilization to the site, and field personnel orientation. The orientation meeting will familiarize the sampling team with a brief history of the site, health and safety requirements, and SMP monitoring procedures. Mobilization and demobilization will take place before and after completion of routine periodic SMP monitoring events. Demobilization will consist of site area clean-up, staging and inventory of monitoring-derived wastes, decontamination and demobilization of field equipment, and organization of monitoring records.

##### ***4.1.2 Waste Characterization***

If impacted soils are to be excavated and removed from the site for disposal, waste characterization samples will be collected to allow for a disposal facility to be selected a waste approval granted prior to the start of excavation activities. Verification sampling procedures and frequency will be in accordance with the requirements of the prospective disposal facility.

##### ***4.1.3 Soil Excavation and Removal***

If necessary, soils will be excavated from the proposed excavation area utilizing an excavator and/or hand tools. Soils will be screened during excavation and stockpiled on site either adjacent to the work area or nearby an access

area for the material to place into a truck for off-site disposal. Soils will be screened utilizing a photoionization detector (PID) capable of detecting the presence of VOCs. Soils exhibiting significantly elevated PID responses or odors may be segregated and stockpiled from other soils being excavated. Trees, shrubs and underbrush within the excavation area will be cleared and disposed of as necessary.

#### **4.1.4 SSDS and SVE System Monitoring and Sampling**

If the SSDS is activated, observations (e.g., system component integrity, etc.) will be noted on the system performance log. The system performance log will serve as the inspection form for the SSDS, if activation is deemed necessary. If activated, vacuum readings will be collected from the permanent vapor monitoring points by temporarily replacing the point cover cap outfitted with a brass barb or equivalent. The barb will be outfitted with ¼ inch diameter tubing connected to a vacuum gauge and vacuum readings will be recorded in the system performance logs.

Soil vapor samples will be collected from the vapor monitoring points in accordance with NYSDOH guidance by creating a seal around the sampling location and inserting a tube into a laboratory provided SUMMA can sampler that extends into the sampling location. Ambient air samples will be collected with laboratory provided SUMMA cans as well. Soil vapor samples and ambient air samples will be collected for USEPA method TO-15 for VOCs.

## **5.0 SAMPLE CUSTODY AND DOCUMENTATION**

For samples collected from the site for laboratory analysis, a chain-of-custody/request for analysis form will be completed and submitted to the laboratory with samples to be analyzed. A copy of the chain-of-custody will be retained by the Project Manager. The chain-of-custody will include the project name, sampler's signature, sample IDs, date and time of sample collection, and analysis requested.

Samples will be packaged and shipped in a manner that maintains sample preservation requirements during transport (i.e., ice to keep samples cool until receipt at the laboratory), ensures that sample holding times can be achieved by the laboratory, and prevents samples from being tampered with.

If a commercial carrier ships samples, a bill of lading (waybill) will be used as documentation of sample custody. Receipts for bills of lading and other documentation of shipment shall be maintained as part of the permanent custody documentation. Commercial carriers are not required to sign the chain-of-custody as long as it is enclosed in the shipping container and evidence tape (custody seal) remains in place on the shipping container.

Identification and documentation of samples are important in maintaining data quality. Strict custody procedures are necessary to ensure the integrity of the environmental samples. Sections below address sample identification, packaging, shipping, and documentation.

### **5.1 Sample Identification System**

The method of identification of a sample depends on the type of measurement or analysis performed. When field screening measurements (e.g., pH, conductivity) are made, data are recorded directly in logbooks. Identifying information such as project name, sample location and depth, date and time, name of sampler, field observations, remarks, etc. shall be recorded.

Each sample collected for off-site laboratory analysis during the field investigation will be specifically designated by PWGC for unique identification. Samples will be identified using a letter code to indicate sample collection methodology. A letter code (see below) will follow, along with the name and/or number that identifies the specific location where the sample was collected. Field equipment blanks will be denoted by the letter code "FB" and trip blanks with "TB." Sample collection date and time will be recorded in the field logbook, chain of custody as well as the sample label.

At a minimum, all location and identification information for the samples shall be recorded in the field sampling logbook, and on the appropriate chain of custody record form for shipment.

### **5.2 Sample Custody, Packaging and Shipping**

Sample custody shall be strictly maintained and carefully documented each time sample material is collected, transported, received, prepared, and analyzed. Custody procedures are necessary to ensure the integrity of the samples, and samples collected during SMP monitoring activities must be traceable from the time the samples are collected until they are disposed of and/or stored, and their derived data are used in the subsequent monitoring report. Sample custody is defined as (1) being in the sampler's possession; (2) being in the sampler's view, after being in the sampler's possession; (3) being locked in a secured container, after being in the sampler's possession; and (4) being placed in a designated secure area.

#### **5.2.1 Field Custody, Packaging and Shipping Procedures**

Field custody procedures shall be implemented for each sample collected. The field sampler shall be responsible for the care and custody of the samples until they are properly transferred or dispatched. To maintain the integrity of the samples, the samples are to be stored in a designated, secure area and/or be custody sealed in the appropriate containers prior to shipment.



Each environmental sample will be properly identified and individually labeled. Labels will be filled out in indelible ink with at least the following information: sample identification (see Section 5.1), type and matrix of sample, date and time of sample acquisition, name of sampler, analysis required, and preservation (as necessary). The sample label will be securely attached to the sample container.

Environmental samples being analyzed by off-site laboratories will be properly packaged and shipped for analysis. Samples are to be packed with sufficient wet ice to cool the samples to 4°C. Additionally, each cooler will be packed with a cooler temperature blank. Lastly, the cooler should be filled with adequate cushioning material to minimize the possibility of container breakage.

A laboratory supplied completed chain of custody form will be included with all sample shipments. When the samples are being shipped by an overnight delivery service to the laboratory, the chain of custody form and any other paperwork shall be checked against the sample labels and field documentation, and then placed in a waterproof sealable plastic bag and taped securely to the inside lid of the cooler. The cooler must then be secured, with custody seals affixed over the lid opening in at least two locations, and the cooler wrapped with strapping tape (without obscuring the custody seals). Orientation “this end up” arrows shall be drawn or attached on two sides of the cooler, and a completed overnight delivery service shipping label shall be attached to the top of the cooler.

Samples to be shipped by an overnight delivery service shall be shipped within 24 hours of sample collection and arrive at the laboratory within 24 hours of sample shipment. A member of the field team will notify the laboratory of a sample shipment.

#### *5.2.2 Laboratory Custody Procedures*

The following generally summarizes laboratory custody procedures; more detailed operations are presented in the laboratory’s SOPs.

- A designated sample custodian will accept custody of the shipped samples and will verify that the information on the sample labels matches that on the chain of custody record(s),
- The laboratory custodian will use the sample label number or assign a unique laboratory number to each sample label and will assure that all samples are transferred to the proper analyst or stored in the appropriate secure area; and,

- Laboratory personnel are responsible for the care and custody of samples from the time they are received until the sample is exhausted or returned to the custodian or sample storage area. Internal chain of custody records shall be maintained by the laboratory.

The laboratory shall communicate with PWGC personnel by telephone, email or facsimile, as necessary, throughout the process of sample scheduling, shipment, analysis and data reporting, to ensure that samples are properly processed. If a problem occurs during sample shipment or receipt (e.g., a sample container arrives broken or with insufficient sample volume, a sample was not preserved correctly, a sample was not listed on the chain of custody, etc.), the laboratory shall immediately notify the appropriate person for resolution.

Samples received by the laboratory will be retained until analyses and QA checks are completed. When sample analyses and necessary QA checks have been completed, the unused portion of the sample and the sample container must be disposed of properly by the laboratory. All identifying tags, data sheets, and laboratory records shall be retained as part of the permanent documentation.

## **6.0 ANALYTICAL REQUIREMENTS**

Analytical services will be provided by a NYSDOH ELAP approved laboratory. The laboratory will follow NYSDEC Analytical Sampling Protocol (ASP) and provide data in results only format, with the exception of the final round of sampling in which data will be reported with Category B deliverables (ASP-B). Analyses not available using ASP-B will be provided in results only format. Samples will be analyzed as follows:

### *6.1.1 Vapor and Air Samples*

Vapor samples will be collected from the SSDS monitoring points and ambient air samples will be collected as described in the SMP. Each sample will be analyzed for VOCs by USEPA Method TO-15. Samples will be collected in laboratory supplied batch-certified SUMMA canisters. The hold time for VOC analysis is 14 days.

## 7.0 DECONTAMINATION PROCEDURES

In order to minimize the potential for cross-contamination, non-dedicated drilling and sampling equipment shall be properly decontaminated prior to and between sampling/possible drilling locations.

### 7.1.1 General Procedures

Sampling equipment and probes will be decontaminated in an area covered with plastic sheeting near the sampling location. Waste material generated during decontamination activities will be containerized, stored and disposed of in accordance with the procedures detailed in Section 5.9. Decontamination of sampling equipment shall be kept to a minimum, and wherever possible, dedicated sampling equipment shall be used. Personnel directly involved in equipment decontamination shall wear appropriate protective equipment.

### 7.1.2 Sampling Equipment

Sampling equipment (i.e., trowels, knives, split-spoons, bowls, hand augers, submersible pumps, etc...) will be decontaminated prior to each use as follows:

- Laboratory-grade glassware detergent and tap water scrub to remove visual contamination
- Generous tap water rinse
- Distilled water rinse

### 7.1.3 Meters and Probes

All meters and probes that are used in the field (other than those used solely for air monitoring purposes, e.g., PID meters) will be decontaminated between uses as follows:

- Laboratory-grade detergent and tap water solution wash
- Tap water rinse
- Distilled water rinse (triple rinse)

Decontamination of sampling equipment will be kept to a minimum in the field, and wherever possible, dedicated disposable sampling equipment will be used. Decontamination fluids will be stored in US Department of Transportation (DOT)-approved 55-gallon drums or in an on-site storage tank (liquids only) until proper disposal. Personnel directly involved in equipment decontamination will wear protective clothing in accordance with the project Health and Safety Plan (HASP).

## **8.0 QUALITY ASSURANCE/QUALITY CONTROL SAMPLE REQUIREMENTS**

This section will discuss the type and quantities of QA/QC samples to be utilized during implementation of the field program.

### **8.1 Field Quality Control Samples**

The subsections below present general information and guidance on field QC samples, including definition and frequency of QC blanks. Field QC samples will be labeled and shipped according to the procedures outlined in Section 5.0.

#### *8.1.1 Equipment Blanks*

An equipment blank will be collected to evaluate the potential for contamination of environmental samples from inadequate decontamination of field equipment. Equipment blanks shall be collected by pouring laboratory supplied distilled/deionized (DI) water over and/or through decontaminated non-disposable equipment or disposable equipment and collecting the rinsate. Equipment blanks will be collected at a frequency of one per decontamination event per type of sampling equipment, not to exceed one per day per sample matrix. Preservation and analysis of equipment blanks will be identical to that of the associated environmental samples.

#### *8.1.2 Trip Blanks*

A trip blank serves to detect possible cross-contamination of samples resulting from handling, storage and shipment procedures. In the event that VOC analysis is necessary, trip blanks will accompany VOC glassware in transit through sample collection and shipment to the laboratory. In addition, trip blanks are stored by the laboratory under the same conditions as the environmental samples. A trip blank will accompany each cooler containing samples submitted for VOC analysis (if any), and will be preserved as per the groundwater samples and analyzed identically to the associated environmental samples. VOC samples will be consolidated in one cooler for daily shipment, if possible, to minimize the number of trip blanks required in the field program. Due to the lack of VOC impact identified at the site, it is not anticipated that trip blanks will be necessary during remedial action.

#### *8.1.3 Temperature Blanks*

A temperature blank will be sent with each cooler of samples to verify that the cooler temperature has been maintained at 4°C. One non-preserved VOA vial shall be filled with either potable or DI water, and labeled with "USEPA cooler temperature indicator" and the date. If supplied, the laboratory's temperature blank will be used in place of the VOA vial. The laboratory shall record the temperature of the blank water on the chain of custody immediately upon cooler arrival.



#### **8.1.4** *Field Environmental Duplicate Samples*

Duplicate environmental samples will be analyzed by the off-site laboratories to evaluate the reproducibility of the sampling procedures. Duplicate samples will be collected at a rate of five percent of the total samples for each specific matrix for each type of analysis (i.e., one duplicate for up to every 20 samples). The duplicate samples will be collected from the same location and at the same time as the original environmental sample; however, the duplicated samples will be "coded" in such a manner that the laboratory will not be able to determine of which original field sample they are duplicated (i.e., "blind" duplicates). For example, the duplicate sample of location EP001 may be "coded" as location EP051, as long as there are not more than fifty endpoint samples being collected (i.e., the coded sample name should not be assigned a legitimate sample location identification). An explanation of the duplicate "coding" must be written in the field logbook. Preservation and analysis of duplicate samples will be identical to those for the environmental samples. Precision of field data will be evaluated based on the calculation of Relative Percent Difference (RPD), with acceptance criteria of 25 percent for the off-site laboratory samples. Blind duplicate samples will be collected in the same manner as the environmental samples.

### **8.2** **Laboratory Quality Control Samples**

General information and guidance on laboratory QC samples are presented in the subsections below. A summary of QC procedures, frequencies, criteria, and corrective actions for the samples, as determined by the applicable method guidelines.

#### **8.2.1** *Method Blanks/Preparation Blanks*

A method blank (for organics) or a preparation blank (for inorganics) will be analyzed with every batch of samples to ensure that contamination has not occurred during the analytical process. Method blanks consist of a portion of analyte-free water or solid that is processed through the entire sample procedure the same as an environmental sample.

#### **8.2.2** *Matrix Spikes/Matrix Spike Duplicates*

Matrix spike/matrix spike duplicate samples (also known as spike/duplicate samples) will be used to assess precision and accuracy of the analytical methods. In this procedure, three aliquots of an actual field sample are collected at a specific location, and two aliquots are "spiked" by the addition of known amounts of an analyte or analytes and these samples are then analyzed identically to the field samples. A comparison of the resulting concentration to the original sample concentration and among the two "spiked" sample concentrations provides information on the ability of the analytical procedure to generate a correct result from the sample. Matrix spike/matrix spike duplicate samples will be collected in the field at a rate of five percent, and will be analyzed on a per batch basis, with up to 20 samples per week constituting a batch. The validity of matrix

spike/matrix spike duplicate recovery and relative percent difference values will be determined using the acceptance criteria

#### *8.2.3 Laboratory Control Samples*

A laboratory control sample (LCS) consists of an analyte-free water or solid phase sample that is spiked with target analytes at a known concentration. The LCS shall be analyzed for every batch of samples (i.e., 1 per 20) to assess the ability of the analytical procedure to generate a correct result without matrix effects/interferences affecting the analysis. The percent recoveries for the LCS compounds will be compared to QC limits stated in the appropriate methods.

#### *8.2.4 Surrogate Compounds*

Surrogates (also known as System Monitoring Compounds) are compounds of known concentrations added to every organic analysis sample for analytical chromatography methods at the beginning of the sample preparation to monitor their recovery. Surrogate recoveries will be used to assess potential matrix interferences and to monitor any potential effects of sample preparation and analysis on final analyte concentrations. The recovery values will be compared to values established in the applicable methodologies to determine the validity of the data.

#### *8.2.5 Internal Standards*

Internal standards are used to provide instrument correction for variation in instrument performance and injection volumes. Internal standards also establish relative response factors for the analytes.

#### *8.2.6 Interference Check Samples*

An interference check sample (ICS), which contains target analytes at known concentrations, verifies the laboratory's interelement and background correction factors. Analysis of ICS samples is unique to metals analysis using the inductively coupled plasma (ICP) method.

## **9.0 INSTRUMENT CALIBRATION AND PREVENTIVE MAINTENANCE**

### **9.1 Calibration**

Equipment will be inspected and approved by the Field Team Leader before being used. Equipment will be calibrated to factory specifications, if required. Monitoring equipment will be calibrated following manufacturers recommended schedules. Daily field response checks and calibrations will be performed as necessary (i.e. PID calibrations) following manufacturers standard operating procedures. Equipment calibrations will be documented in a designated field logbook.

The Field Team Leader or his designee will be responsible for ensuring that instrumentation are of the proper range, type and accuracy for the measurement/test being performed, and that all of the equipment are calibrated at their required frequencies, according to their specific calibration protocols/procedures.

All field measurement instruments must be calibrated according to the manufacturer's instructions prior to the commencement of the day's activities. Exceptions to this requirement shall be permitted only for instruments that have fixed calibrations pre-set by the equipment manufacturer. Calibration information shall be documented on in a designated field logbook. Information to be recorded includes the date, the operator, and the calibration standards (concentration, manufacturer, lot number, expiration date, etc.). All project personnel using measuring equipment or instruments in the field shall be trained in the calibration and usage of the equipment and are personally responsible for ensuring that the equipment has been properly calibrated prior to its use.

In addition, all field instruments must undergo response verification checks at the end of the day's activities and at any other time that the user suspects or detects anomalies in the data being generated. The checks consist of exposing the instrument to a known source of analyte (e.g., the calibration solution), and verifying a response. If an unacceptable instrument response is obtained during the check the data shall be labeled suspect, the problem documented in the site logbook, and appropriate corrective action taken.

Any equipment found to be out of calibration shall be recalibrated. When instrumentation is found to be out of calibration or damaged, an evaluation shall be made to ascertain the validity of previous test results since the last calibration check. If it is necessary to ensure the acceptability of suspect items, the originally required tests shall be repeated (if possible), using properly calibrated equipment. Any instrument consistently found to be out of calibration shall be repaired or replaced.



## **9.2 Preventive Maintenance**

Field equipment shall be maintained at its proper functional status in accordance to manufacturer manual specifications. A check of the equipment shall be performed before field activities begin, and any potential spare parts (e.g., batteries, connectors, etc.) and maintenance tools will be brought on site, to minimize equipment downtime during the field activities. Visual checks of the equipment will be conducted on a daily basis. Routine preventive maintenance shall be performed to assure proper operation of the equipment. Any maintenance performed on field equipment will be documented in the designated field logbook and shall be undertaken by personnel who have the appropriate skills and/or training in the type of maintenance required.

## **10.0 DATA REDUCTION, VALIDATION, AND REPORTING**

Standard methods and references will be used as guidelines for data handling, reduction, validation, and reporting. All data for the project will be compiled and summarized with an independent verification at each step in the process to prevent transcription/typographical errors. Any computerized entry of data will also undergo verification review.

### **10.1 Data Reduction**

#### *10.1.1 Field Data Reduction*

Field instrumentation data will be reported by site personnel in field logbooks associated with the monitoring event. At the end of each monitoring event, the field screening data results shall be summarized in tabulated form, as warranted.

#### *10.1.2 Laboratory Data Reduction*

All data generated by the off-site laboratory will be reported in a specified format containing all required elements to perform data validation. Analytical results shall be presented on standard NYSDEC ASP-B forms (when necessary) or equivalents, and include the dates the samples were received and analyzed, and the actual methodology used. Laboratory QA/QC information required by the method protocols will be compiled, including the application of data QA/QC qualifiers as appropriate. In addition, laboratory worksheets, laboratory notebooks, chains-of-custody, instrument logs, standards records, calibration records, and maintenance records, as applicable, will be provided in the laboratory data packages to determine the validity of data.

#### *10.1.3 Project Data Reduction*

Following receipt of the laboratory analytical results by PWGC, the data results will be compiled and presented in an appropriate tabular form. Where appropriate, the impacts of QA/QC qualifiers resulting from laboratory or external validation reviews will be assessed in terms of data usability.

#### *10.1.4 Non-Direct Measurements*

If information necessary for the project has not been measured directly in the field, non-direct measurement data may be obtained from literature files, texts, computer databases, etc. References utilized will be acknowledged sources within the specific discipline. An explanation of the rationale behind using the reference and a description of any concern regarding the use of the referenced data (e.g., uncertainty, conflicting literature, etc.) shall be made within the report. Non-direct measurement data, after usage, will be filed within the project files for the length of the project.

### **10.2 Data Usability and Validation**

The main purpose of the data is for use in defining the extent of contamination at the site, to aid in evaluation of potential human health and ecological exposure assessments, and to support remedial action decisions. Based upon this, data use usability and validation will be performed as described below. Complete data packages will be archived in the project files, and if deemed necessary additional validation can be performed using procedures in the following sections. It is anticipated that data validation will be performed on data collected during the final round of sampling, only.

#### *10.2.1 Data Usability and Validation Requirements*

Data usability and validation are performed on analytical data sets, primarily to confirm that sampling and chain-of-custody documentation are complete, sample IDs can be tied to specific sampling locations, samples were analyzed within the required holding times, and analyses are reported in conformance to NYSDEC ASP, Category 2 data deliverable requirements as applicable to the method utilized.

#### *10.2.2 Data Usability and Validation Methods*

If deemed necessary by NYSDEC, a data usability evaluation for the data collected and a data usability summary report (DUSR) will be prepared each sampling event performed under the requirements of the SMP. The DUSR will be prepared in accordance with NYSDEC DER-10, Appendix 2B.

Independent third party data validation will be performed on 5% of the sample data, or on one sample from each sample delivery group (SDG), whichever is greater. Data validation will be performed by a qualified subcontractor independent of the project.

## 11.0 CORRECTIVE ACTION

Review and implementation of systems and procedures may result in recommendations for corrective action. Any deviations from the specified procedures within approved project plans due to unexpected site-specific conditions shall warrant corrective action. All errors, deficiencies, or other problems shall be brought to the immediate attention of the PWGC PM, who in turn shall contact the Quality Assurance/Data Quality Manager or his designee (if applicable).

Procedures have been established to ensure that conditions adverse to data quality are promptly investigated, evaluated and corrected. These procedures for review and implementation of a change are as follows:

- Define the problem.
- Investigate the cause of the problem.
- Develop a corrective action to eliminate the problem, in consultation with the personnel who defined the problem and who will implement the change.
- Complete the required form describing the change and its rationale (see below for form requirements).
- Obtain all required written approvals.
- Implement the corrective action.
- Verify that the change has eliminated the problem.

During the project, all changes to the SMP will be documented in field logs/sheets and the PWGC PM will be advised.

If any problems occur with the laboratory or analyses, the laboratory must immediately notify the PM, who will consult with other project staff. All approved corrective actions shall be controlled and documented.

All corrective action documentation shall include an explanation of the problem and a proposed solution which will be maintained in the project file or associated logs. Each report must be approved by the necessary personnel (e.g., the PM) before implementation of the change occurs. The PWGC PM shall be responsible for controlling, tracking, implementing, and distributing identified changes.

## Andrew Lockwood, PG, LEP

SR. VICE PRESIDENT

### PROFESSIONAL EXPERIENCE

PWGC: 18 years

PRIOR: 17 years

### AREAS OF EXPERTISE

Phase I and Phase II Environmental Site Assessments  
PFAS and other emerging contaminants  
Petroleum spill site investigation/remediation  
CERCLA sites  
NYSDEC Brownfield Cleanup Program/Environmental Restoration Program  
Environmental/Regulatory Compliance (Investigation/Remediation Mgmt.)  
Radiological Characterization & Remediation  
Chemical, Radiological/Mixed Waste Management & Disposal  
Groundwater Treatment System (Planning, Design, O&M)  
Client Representation & Regulatory Liaison  
Environmental Program Mgmt. (Planning, Monitoring, Safety)



### EDUCATION & TRAINING/CERTIFICATION

BA Geology, SUNY Potsdam, NY

Licensed Professional Geologist - NYS

Licensed Environmental Professional (LEP), State of Connecticut

"D&D of Research Reactors & Other Small Nuclear Facilities" Certificate (Argonne National Laboratory, 11/2001)

OSHA Health & Safety 40-hr, Supervision 8-hr

30-hr OSHA Construction Safety Training, 2009

### PROFILE

Mr. Lockwood specializes in planning and managing U.S. Environmental Protection Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and New York State Department of Environmental Conservation (NYSDEC) remedial investigations/Feasibility Studies, Phase I and Phase II ESAs, Brownfields Cleanup Program (BCP) projects, and nuclear facility decontamination & decommissioning (D&D). He has worked at numerous DOE and DOD facilities in more than a dozen states across the country managing remedial investigation/feasibility study projects involving the generation of radiological, hazardous, and mixed waste. They include multi-year projects that involved complex investigations, remediation, and waste management issues. Mr. Lockwood manages PWGC's environmental group, overseeing a staff of more than 20 professionals.

Mr. Lockwood has over 35 years of experience managing environmental investigation and remediation projects including CERCLA RI/FS sites, NYSDEC BCP sites, NYCDEP "E" sites, Municipal Landfill permitting and closure, and environmental investigations for real estate transactions. Mr. Lockwood's clients range from large governmental agencies to small real estate developers. He has performed work across the eastern United States under numerous federal, state, and local regulatory agencies.

### NOTABLE PROJECTS

#### Suffolk County Fire Training Facility - Yaphank, NY—RI/FS (Ongoing)

Mr. Lockwood manages the ongoing RI/FS for the Suffolk County fire training facility in Yaphank, NY. The 28-acre site is in the NYSDEC's inactive hazardous waste site program. The site was listed as a NYS Class 2 Inactive Hazardous Waste Disposal Site in August 2017. The primary contaminants of concern are per and poly fluoroalkyl substances (PFAS). The presence of these compounds is the result of the use of the Aqueous Film Forming Foam (AFFF) at the site. Mr. Lockwood was responsible for the preparation of the Citizens Participation Plan, Records Search Report, RI Work Plan, Quality Assurance Project Plan and Health and Safety Plan. The RI field work included delineation of PFAS in soil on-site and in groundwater both on and off site. PWGC is currently preparing a feasibility study with alternatives to address both soil and groundwater contamination at the site.

#### Wertheim National Wildlife Refuge - Shirley, NY—POET System Design and O&M (Ongoing)

Three Point of Entry Treatment (POET) Systems were designed and installed at the refuge, one in a maintenance garage and two in residential buildings located within the refuge. The POET Systems were designed to remove per and poly fluoroalkyl substances (PFAS) that were detected in the groundwater supply wells servicing the three structures. Mr. Lockwood was responsible for the preparation of an Engineering Report and Operations and Maintenance Manuals for the systems. PWGC oversaw the installation



and start up testing of the systems and is performing the scheduled system sampling to ensure that the systems are functioning as designed.

#### **Carmans River - Shirley, NY—Surface Water and Biota Monitoring (Completed)**

Mr. Lockwood managed the investigation of per and poly fluoroalkyl substances (PFAS) in surface water and biota within the Carmans River and other water bodies within Suffolk County. Mr. Lockwood prepared a Biota Monitoring Work Plan/QAPP that included the collection of surface water and biota samples (eels, blue crabs, white perch, and clams) for PFAS analysis. He prepared a Biota Monitoring Report detailing the results of the investigation.

#### **Project Manager- Building 650 Demolition (Completed)**

Mr. Lockwood managed the D&D of the former hot laundry and equipment decontamination facility (Bldg. 650) at BNL between 2020 and 2021. The project involved overseeing demolition of radiologically contaminated above ground and below ground structures, preparation of project documents including a Remedial Action Work Plan, Sampling and Analysis Plan, and Completion Report. The project involved the disposition of complex waste streams and the completion of a as left radiological survey. Mr. Lockwood was responsible for completing the project on schedule and within the allocated budget.

#### **Brookhaven National Laboratory - Upton, NY (Completed)**

Mr. Lockwood served more than 10 years as Project Manager on various CERCLA projects for BNL Environmental Restoration Division (ERD). He has managed diverse projects for BNL's Groundwater, Surface, and Reactor Groups. On his most recent projects for the Reactor Group, Mr. Lockwood provided project management services on four remediation projects over a 3-year period with budgets totaling more than 15 million dollars. In addition, he has prepared or assisted in the preparation of site-specific project documents such as work plans, sampling and analysis plans, quality assurance project plans, health and safety plans, records of decision (ROD), completion reports, final status surveys, remedial investigations (RI) and feasibility studies (FS). He has prepared contract documents, including request for proposals (RFP's), scopes of work (SOWs), and contract specifications for both large- and small-scale procurements and has acted as the technical representative on multiple contracts, ensuring the contract scope is being completed.

Mr. Lockwood combines his technical background with his in-depth knowledge of BNL's protocols and procedures to prepare schedules and cost estimates for baseline and fiscal year budgeting and tracking, provide short-term assistance to help BNL complete Baseline Change Proposals, and long-term assistance to manage remedial projects.

#### **Project Manager- Fan Houses and Stack Silencer D&D, Underground Utilities Removal, Perimeter Area Soil Remediation Projects**

Mr. Lockwood managed multiple remediation projects at BNL between 2008 and 2011. Project involved overseeing demolition of radiologically contaminated above ground and below ground structures, preparation of project documents including Remedial Action Work Plans, Sampling and Analysis Plans, and Completion Reports. The projects involved the disposition of complex waste streams. He was the primary interface with regulatory agencies and DOE. Mr. Lockwood was responsible for completing the projects on schedule and within the allocated budget. All projects were successfully completed.

#### **Brownfield Cleanup (BCP) and Environmental Restoration Program Projects (Ongoing)**

Mr. Lockwood manages BCP and ERP projects for both private and municipal clients. He prepares applications, technical documents, and interfaces with NYSDEC project managers to ensure project schedule and scope meet NYSDEC's requirements for approval of incentives/reimbursements. These sites require preparation of BCP and ERP applications, technical work plans, RI reports, human health and ecological assessments, remedial alternatives reports (FS), citizens participation plans, public meetings, and completion reports. Under contract with the Suffolk County department of Health Services (SCDHS) and the Department of Public Works (DPW), Mr. Lockwood assists the County in managing the technical aspects of County owned sites in the NYSDEC Brownfields Cleanup and Environmental Restoration Programs. These sites include former United State Air Force Disposal Sites and former industrial and gasoline service station sites, which are currently vacant or unused because the redevelopment of the sites is hampered by historical site uses that contaminated soil and groundwater.

## Dwight Chase .

### PROJECT HYDROGEOLOGIST

#### PROFESSIONAL EXPERIENCE

PWGC: 1 year

#### AREAS OF EXPERTISE

Water, Soil, Air Sampling  
Field Work (Protocol, Oversight, Documentation)  
Site Investigation/Analysis  
Health & Safety Monitoring  
Sampling

#### EDUCATION & TRAINING/CERTIFICATION

BS, Earth Environmental System Science, The City University of New York  
BS, Mechanical Engineering, Penn State University  
10-Hour OSHA Hazard Recognition Training for the Construction Industry.  
HAZWOPER 40-Hour  
Autodesk Inventor Certified User



#### PROFILE

Mr. Chase, a graduate from CUNY in Earth Environmental System Science, will work with the Environmental Unit focusing on remediation and due diligence projects throughout New York. He will provide management, oversight, and documentation on projects, technical field services for environmental investigations, and due diligence inspection services. He will continuously improve his skills in the areas of soil sampling, groundwater monitoring, air quality sampling and Phase I & II site assessments. He has an excellent track record of timely completion of deliverables, monitoring, and document preparation, while successfully maintaining communication between multiple stakeholders.

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#### NOTABLE PROJECTS



## Jennifer Lewis, PG

VICE PRESIDENT

### PROFESSIONAL EXPERIENCE

PWGC: 17 years

### AREAS OF EXPERTISE

NYSDEC Brownfield Cleanup Program Management  
NYCOER Brownfield and "E" Designation Management  
Work Plan/Report Preparation  
Phase I & II Environmental Site Assessments  
Underground Injection Structure Remediation  
Underground Storage Tank Remediation  
Water, Soil, Air Sampling  
Data Management & Interpretation  
Groundwater Remediation via Chemical Injection

### EDUCATION & TRAINING/CERTIFICATION

MBA, CUNY Baruch, New York, NY  
BS, Geology, SUNY Stony Brook, NY  
AA, Liberal Arts, Suffolk County Community College, Selden, NY  
Licensed Professional Geologist - NYS  
OSHA Health & Safety 8-hr Supervisor, 40-hr HazWoper  
Construction Management Certification  
ASTM Training on Phase I and Phase II Environmental Site Assessments for Commercial Real Estate



### PROFILE

As a Vice President, Ms. Lewis has assisted property buyers, sellers, and developers navigate potential environmental concerns, petroleum spills, the New York State (NYS) Brownfield Cleanup Program, the New York City (NYC) E-Designation Program/Voluntary Cleanup Program requirements during property transactions and site development. Ms. Lewis's roles on these projects has included planning, conducting, and reporting soil/groundwater investigations, air quality studies, and instituting remedial measures. Her clients, ranging from developers to attorneys to municipal agencies, benefit from her expertise in overseeing Phase I and II Environmental Site Assessments (ESAs), Remedial Investigations, cost to cure estimates for financial institutions, and Brownfields projects. Ms. Lewis coordinates with clients and attorneys to prepare plans for approval by federal, state, and local agencies (e.g., Remedial Action Plans, Health and Safety Plans, Investigation Work Plans, Interim Remedial Measures) and monitors each project's day-to-day progress to meet the client's objectives and regulatory requirements.

### NOTABLE PROJECTS

#### Phase I & II Environmental Site Assessment

Ms. Lewis manages Phase I & II ESA preparation, implementation, and completion. For each project, she provides a customized scope of work and relevant documentation to provide clients with pertinent information. She performs Phase I & Phase II ESAs for private clients, environmental attorneys, municipalities, and lending institutions for use in property transactions according to ASTM Standards.

#### Brownfield Redevelopment

**AvalonBay Communities, Inc. – Former Darby Drug Facility, Rockville Centre, NY – NYSDEC Brownfield Cleanup Program Implementation During Development**

The Former Darby Drugs Distribution Center was a commercial warehouse formerly occupied by a textile company which was a source of PCE contamination to soil and groundwater beneath the site. The site was enrolled in the NYSDEC Brownfield Cleanup Program (BCP). Ms. Lewis implemented an Interim Remedial Measure which included a sophisticated soil excavation and dewatering program within a warehouse, chemical injections into the groundwater, and UIC remediation. Ms. Lewis then documented the Interim Remedial Measure effort and prepared an Alternatives Analysis and a Remedial Action Work Plan to provide a scope for additional remediation and a Final Engineering Report and a Site Management Plan to document the results of the remedial action and protective steps to follow for the future use of the site.

#### Brownfield Redevelopment

**Coney Island Realty – NYSDEC BCP Site**

During the Interim Remedial Measure Phase, Ms. Lewis coordinated the soil excavation, community air monitoring, and sampling activities. Ms. Lewis also prepared reports detailing the Supplemental Remedial Investigation and Interim Remedial Measure, as



well as the Remedial Action Work Plan to provide a scope for additional remediation and a Final Engineering Report and a Site Management Plan to document the results of the remedial action and protective steps to follow for the future use of the site. Ms. Lewis has continued overseeing the routine operation and maintenance of a soil vapor extraction system operating at the site.

#### Suffolk County Department of Public Works (SCDPW) – Suffolk County, NY

##### UIC Remediation

Ms. Lewis was responsible for maintaining a UIC structure database for SCDPW and conducting UIC investigations and remediations as part of the planned upgrade of SCDPW site sanitary upgrades. Ms. Lewis coordinated closely with SCPWS, SCDHS, and contractors to conduct this work efficiently and within budget.

#### Brookhaven National Laboratory – Upton, NY

##### OUIII Western South Boundary/OUI South Boundary Vertical Profiles and Monitoring Well Installation

Ms. Lewis provided sampling services and hydrogeologic oversight for multiple vertical profiles, as part of the on-site OUIII plume evaluation. Her responsibilities included the collection of groundwater samples during sampling. She was responsible for construction observation and documentation for 3 monitoring well installations. After installation, wells were developed by pumping and surging. Ms. Lewis documented field activities and verified the work that was performed in accordance with BNL's Standard Operating Procedures and Project Work Plans. She conducted daily tailgate safety meetings, completed BNL's daily field reports and reported to BNL's Project Manager at the completion of each day.

#### Pratt Institute – Brooklyn, NY

##### Well Installation

Ms. Lewis provided over-site for the installation of a geothermal test well. She generated boring logs, documented soil characteristics, and classified in accordance with USGS' Monthly/Quarterly Groundwater/Air Sampling.

##### Well Monitoring

Ms. Lewis performs routine monitoring and sampling of air and groundwater, and product removal if necessary, at various sites. In addition to the fieldwork at these sites, Ms. Lewis analyzes the data and prepares a site plan and a quarterly report detailing the results and future recommendations.

#### Brookhaven National Laboratory – Upton, NY

##### Environmental Protection Division: Groundwater Protection and Remediation

Ms. Lewis supervised the installation of multiple vertical profiles via geoprobe to monitor strontium-90, tritium, and volatile organic compound (VOC) plumes on site. Her responsibilities included the collection of groundwater samples during sampling. Ms. Lewis documented field activities and verified the work that was performed in accordance with BNL's Standard Operating Procedures and Project Work Plans. She conducted daily tailgate safety meetings, completed BNL's daily field reports and reported to BNL's Project Manager at the completion of each day.

#### Newark-Liberty International Airport

The Automotive Fueling Station at Newark-Liberty Airport is the site of a UST failure regulated by the NJDEP Site Remediation Program. Ms. Lewis performs routine groundwater monitoring and sampling as well as supplemental remedial activities at the site. Ms. Lewis is also responsible for coordinating field activities with regulators and assisting with preparation of periodic Status Reports. Field work and reporting is completed in accordance with NJDEP Technical Requirements for Site Investigation 7.26E.

#### New York City Housing Authority – New York City, NY

##### Sub-Surface Investigations

Ms. Lewis performs environmental assessments associated with site specific NYSDEC spill files in order to delineate petroleum and tetrachloroethene impacts. Specifically, collection of soil, groundwater, and sub-surface air samples, oversight of monitoring well installations, preparation and submittal of site assessment reports, and coordination with NYCHA staff and regulatory agencies.

#### NYCDEP/NYCOER "E" Designation Sites – New York City, NY

##### RAP & HASP enforcement, air monitoring for particulates and VOCs

Ms. Lewis's services focus on coordinating remedial investigations, preparation of Remedial Investigation Reports, preparing a Remedial Action Scope of Work that considers the contaminants identified at the site as well as the intended use and building design, coordinating the remediation, and documenting the results of the remediation. Ms. Lewis, with the assistance of the architect and mechanical engineer of record, has also prepared Remedial Action Work Plans and Installation Reports for Air and Noise "E"s.

#### Former Penetrex Remedial Investigation

Ms. Lewis oversaw a chemical injection at a former dry cleaning facility utilizing a Geoprobe® that drilled down to 50 feet below grade and pulled the rods up during the injection.





#### USEPA Superfund Site

##### Treatment System O&M

Ms. Lewis provided assistance with the remediation efforts of the down-gradient pond system and oversight of the down-gradient recovery well installation for the USEPA Superfund remediation project. Additional duties included sampling backfill material brought on-site and overseeing the backfilling and compaction of excavations. Allstate Insurance Company – NY Wide Residential/Commercial Fuel Oil Spills Oversight & Reporting – Ms. Lewis oversees fieldwork for projects such as petroleum spill remediation. She completes spill reports, and coordinates with contractors and the NYSDEC to ensure that the project stays on schedule, is compliant with regulatory guidelines, and meets the client's goals.

#### UIC Control Programs – Suffolk and Nassau Counties, NY

##### Remediation Oversight

Ms. Lewis has been overseeing the remediation activities of dry wells (Class V wells) at multiple sites for various clients throughout Suffolk and Nassau Counties. She performs endpoint sampling of storm drains and sanitary systems, coordinates and performs sampling in conjunction with the SCDHS and NCDH, and ensures proper soil and sediment removal during VacTruck operations.

#### Rechler Equity Partners – Melville, NY

##### 250 Miller Place, Hicksville, NY

The subject site, a large commercial property and formerly used by a circuit board manufacturer and trucking company, had a history of chemical uses (i.e. chlorinated solvents, diesel fuel, and gasoline). To determine if subsurface soils had been impacted, PWGC conducted a Phase II investigation for a potential buyer. Ms. Lewis was present during the Phase II and oversaw the project's subsurface investigation-phase. She directed the Geoprobe® operator, and participated in the preparation of the Phase II investigation report. In addition, Ms. Lewis observed the follow-up investigation and remediation performed by the current property owner's consultant.

#### Franklin Hospital – Valley Stream, NY

##### Water Sampling

Ms. Lewis collected water samples from the dialysis treatment suite and from a sink in order to determine the source of a bacterial contamination.



## Ryan Morley, PG.

### SENIOR PROJECT MANAGER

#### PROFESSIONAL EXPERIENCE

PWGC: 14 years

#### AREAS OF EXPERTISE

Water, Soil, Air Sampling  
Phase I/II ESA  
Field Work (Protocol, Oversight, Documentation)  
Site Investigation/Analysis  
Health & Safety Monitoring  
Soil/Groundwater Investigations, Analysis, Sampling  
(Manual; Direct Push Technology Techniques)  
UST Remediation Hazardous Waste Site Investigation/Cleanup  
Underground Injection Well Monitoring

#### EDUCATION & TRAINING/CERTIFICATION

BS, Geology, University at Buffalo, NY  
Licensed Professional Geologist - NY  
40-hr OSHA HAZWOPER, 8-hr Annual Refresher, 10-hr Construction Safety & Health  
Confined Space Entry  
MTA, LIRR & Staten Island Track Safety Training  
CPR/Standard First Aid  
OSHA 10-hr Construction Course  
SWPPP – Stormwater Pollution Prevention Planning Course

#### PROFILE

Mr. Morley provides hands-on support to implement field activities according to work plans and project schedule. He works closely with clients, sub-contractors, and regulatory agencies to ensure prompt and accurate data collection/dissemination. Routinely, Mr. Morley monitors drilling operations and collection of groundwater elevation measurements, and performs several methods of groundwater sampling, utilizing numerous field-screening instruments, and sampling tools.

#### NOTABLE PROJECTS

##### PHASE I/PHASE II ESA

##### Phase I & Phase II Environmental Site Assessment (ESA)

Mr. Morley manages Phase I & II ESA preparation, implementation, and completion. For each project, he provides a customized scope of work and relevant documentation to provide clients with pertinent information. He performs Phase I & Phase II ESAs for private clients, environmental attorneys, municipalities, and lending institutions for use in property transactions according to ASTM Standards.

##### Avalon Bay Communities, Inc. (Former Darby Drug Facility) Rockville Centre, NY

##### New York State Department of Environmental Conservation (NYSDEC) Brownfield's Clean-up Program (BCP) Implementation at 80-100 Banks Avenue

Mr. Morley performed soil, water, and concrete sampling on site after demolition activities. He was also responsible for the oversight of the strict Community Air Monitoring Program during the soil excavation of the chlorinated solvent impacted soils in the middle of a residential neighborhood. Mr. Morley also provided oversight and sampling of the dewatering and treatment system to ensure compliance with NYSDEC SPDES requirements. Following completion of the groundwater treatment system, he conducted routine operation, maintenance and sampling services for the client to ensure that the plume was stabilized as required by the State approved Remedial Action Work Plan.

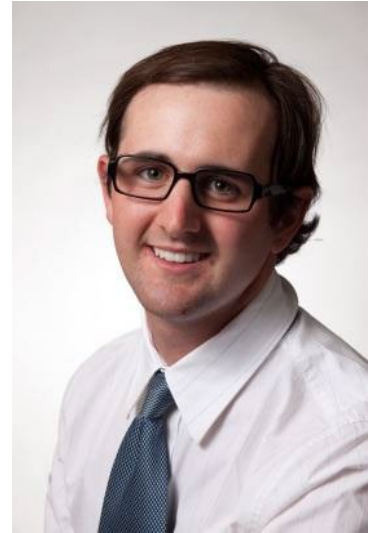
##### GTJ-GROUP/GREEN BUS LINES, INC. - QUEENS/BROOKLYN, NY

##### Hydrogeology/Environmental Services

Services range from Site Investigation (Oversight, and Sample Collection) at six large bus facilities. Mr. Morley conducted site/facility investigations and provided system operation of a free phase groundwater contamination treatment system.

##### Residential/Commercial Fuel Oil Spills Oversight & Reporting

Mr. Morley oversees planning, contractor solicitation and implementation, fieldwork and project reporting for projects such as petroleum spill investigations and remediation. He prepares spill investigation reports and closure reports, and coordinates with





contractors and the NYSDEC to ensure that the project stays on schedule, is compliant with regulatory guidelines, and meets the client's goals.

#### [The Hudson Companies, Brooklyn, NY](#)

##### [NYCDEP Restrictive Declaration Services at 1490 Dumont Avenue in Brooklyn](#)

Mr. Morley was responsible for making sure job proceedings were within NYCDEP regulations. He prepares and implements community air monitoring during remedial activities, inspects vapor barrier installations, and provides oversight during the impacted soil excavation and site remediation activities.

#### [The Witkoff Group, New York, New York](#)

##### [NYCDEP Restrictive Declaration Services at 303 West 10th Street](#)

Mr. Morley provided oversight of contaminated soil cleanup and enforced the correct disposal of soils being exported from the site. In addition, he was responsible for air monitoring and daily reporting to the New York City Office of Environmental Restoration (NYCOER).

#### [Innovant Group - Islandia, NY](#)

##### [Underground Injection Control \(UIC\) Remediation](#)

Mr. Morley performs endpoint sampling of storm drains and sanitary systems, coordinates and performs sampling in conjunction with the Suffolk County Department of Health Services (SCDHS) and Nassau County Department of Health (NCDH), and ensures proper soil and sediment removal.

#### [Lakehill Associates, Massapequa, NY](#)

##### [Tank Pull & Oxygen Release Compound \(ORC\) Injection Reporting at 672 Broadway Avenue in Massapequa, NY](#)

Mr. Morley provided field oversight during the removal of Underground Storage Tanks (UST) that included inspecting the tanks for damage and collection of end-point samples. Following the removal of the tanks, he provided oversight of the backfilling as well as Regenox injections and monitoring of the well installation.

#### [Computer Circuits - Hauppauge, NY](#)

##### [US Environmental Protection Agency \(USEPA\) Regulated Groundwater Sampling](#)

Mr. Morley conducted quarterly sampling at this Federal Superfund site that has a very strict sampling process.

#### [CDM Federal Programs, Matteo & Sons Site -Thorofare, New Jersey](#)

##### [Remedial Investigation/Feasibility Study](#)

The former Computer Circuits industrial site is a US Environmental Protection Agency Superfund Site. Mr. Morley collected groundwater and soil samples in accordance with USEPA guidelines at this National Priorities List site.

#### [Allied Aviation Services of New York, Queens, NY](#)

##### [Sampling](#)

Mr. Morley performs groundwater sampling as well as bimonthly well gauging and product removal at LaGuardia Airport. In addition, he assists in the preparation of the status reports quarterly for the submission to the New York State Department of Environmental Conservation (NYSDEC).

#### [105 Metropolitan Ave, LLC, New York, NY](#)

##### [E-Designation Remedial Action Work Plan \(RAWP\) Implementation](#)

Mr. Morley provided field oversight services at the site which was entered into the NYCOER Voluntary Cleanup Program. Services included reporting to the NYCOER, onsite soil inspection, community air monitoring and coordinating with contractors for the removal of impacted soils to Track 1 standards.

#### [Stiner Studios - Brooklyn, New York, NY](#)

##### [Site Management Plan and Remediation Management](#)

Mr. Morley provided project management for redevelopment projects within the Brooklyn Navy Yard for properties owned by Stiner Studios. These projects were overseen by the NYSDEC and NYCOER and Mr. Morley was the primary environmental manager for these sites. These projects were completed to the satisfaction of NYSDEC and NYCOER with the assistance of Mr. Morley's oversight.

#### [2840 Atlantic Avenue - Brooklyn, New York, NY](#)

##### [Site Management Plan and Remediation Management](#)

Mr. Morley was the primary environmental project manager for the remediation of a 1-acre property in Brooklyn, New York under the NYSDEC BCP program. Mr. Morley was responsible for the proper enactment of a detailed remediation plan that included the removal of contaminated soil, the treatment of impacted groundwater, and the installation of a soil vapor mitigation system. Mr. Morley prepared a final engineering report and site management plan following remediation activities and was responsible for obtaining a NYSDEC COC for the client on time.



## APPENDIX Q-B



## **LABORATORY DATA CONSULTANTS, INC.**

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### **LDC Company Profile**

LDC is a small, minority-owned (SBE/MBE) quality assurance and environmental chemistry company focused on data validation, data quality assessment, database implementation, and data usability. Our primary services include data validation, electronic transfer of data, oversight of quality assurance/quality control (QA/QC) programs, laboratory and field audits, technical support for litigation, and database management. Our corporate office located in Carlsbad, California is directed by Mr. Scott Denzer and Ms. Stella Cuenco, principal chemists with over 50 years of experience between them in the environmental laboratory and data validation industries

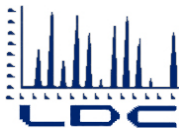
LDC is recognized as one of the leaders in the data validation industry through participation on major DoD and commercial projects such as:

- Army Corps of Engineers, DuPont Chambers (Baltimore District)
- Army Corps of Engineers, DuPont Chambers (Philadelphia District)
- Army Corps of Engineers, Various projects (New Mexico)
- Army Corps of Engineers, Camp Navajo (Tetra Tech)
- Army Corps of Engineers, Various projects, 8a Contract (Sacramento District)
- Army Corps of Engineers, Fort Ord (Shaw E&I)
- Las Vegas Wash Henderson Site (ERM)
- DOE NPR-1 Elk Hills (DOE direct and Ahnta)
- Nevada Environmental Response Trust (NERT) Henderson Site (Ramboll Environ)
- NOAA MDRA Mississippi Site (Entrix)
- Stringfellow Superfund Site (DTSC)
- BKK Landfill (Ramboll Environ)
- EPA Region IX ESAT QA Program (ICF)
- AFCEE/AFCEC, Andersen AFB (EA/Shaw)
- AFCEE/AFCEC, Loring/Pease AFB (Bechtel/MWH)
- AFCEE/AFCEC, Mather AFB (MWH)
- AFCEE/AFCEC, Army Corps of Engineers, Travis AFB (CH2M Hill)
- AFCEE/AFCEC, McClellan and Castle AFB (Jacobs Engineering Group)
- AFCEE/AFCEC, Beale AFB (Law/Crandall, Inc.)
- AFCEE/AFCEC, Andrews AFB (URS)
- Navy CLEAN Atlantic Division (EA Engineering)
- Navy CLEAN IV Southwest DIV (AECOM)
- Navy RAC Southwest Division (OHM Remediation/IT Group/Shaw)

LDC has successfully performed thousands of data validation projects worth over 20 million dollars for prime contractors servicing Air Force (AFCEE/AFCEC), Army Corps, Navy, and industrial activities.

LDC has developed well-documented procedures which support all facets of the data validation process. This includes critical steps such as:

- Project tracking
- Peer review for all data validation activities
- Internal training programs
- Internal and external audits
- Strict documentation
- Electronic deliverables



**LDC as the "Best Value" Contractor**

LDC is a data validation subcontractor with an impeccable track record for timeliness, quality, technical expertise, and the ability to mitigate complex data quality issues. Our clients will confirm our current and past performance under DoD (including USACE), DoE, and commercial programs. We have experience and a proven track record commensurate with the requirements of this RFP as demonstrated by the following:

- **LDC is the software developer and expert in the use of the Automated Data Review (ADR) software.** LDC has been using ADR.NET and has the current version in full implementation which meets USACE and current DoD QSM requirements. LDC has performed over 1000 ADR projects in the past 10 years, worth over \$2,000,000 in revenue. LDC will provide technical support to the Client as needed for e-QAPP generation or EDD troubleshooting.
- Data validation experience as a subcontractor for more than 100 Army Corps sites, over 140 AFCEE/AFCEC sites, several EPA sites, and under 6 Navy CLEAN and RAC contracts and 150 Navy sites. This experience includes 15 years of data validation work under USACE direction and thorough understanding of the USACE Baltimore, EPA Region 2 and 3 validation guidelines, and the DoD QSM.
- Successful completion of USACE data validation activities since 1992 under subcontracts to various Districts including New England, Baltimore, Philadelphia, Omaha, Albuquerque, Seattle, Sacramento, and Jacksonville.
- Recent project experience in the Eastern region including support to four separate contractors on the Passaic River for varied projects and programs with revenues of 200K, and Gowanus Canal with GEI, revenues of 33K.
- **On-time delivery record of greater than 99%** with the ability to expedite turnaround as needed due to our large experienced staff as noted above.
- Successful completion of five DoD and two DoE audits to approve LDC's internal data validation procedures, QA program and documentation systems. (prior to 2000)
- Thorough secondary QA review program and **the capacity (30 full time chemistry staff) to handle a project of this magnitude and importance.** This significantly reduces additional work the consultant might otherwise need to do upon receipt of LDC reports.





### **Data Validation Capacity**

LDC is continually evaluating and monitoring its capacity to meet client needs. It is company policy to not accept a project unless the service can be completed on-time with our expected quality of performance. This policy has proved very successful in meeting past project deadlines. Our client references will confirm our performance of on-time delivery.

Due to the versatile capabilities of our staff, personnel can also support multiple areas which are high in backlog. Our training program documents personnel approvals for all data review activities. All of our staff actively participate in the LDC training program.

LDC has met its contractual turnaround time requirement on over 99% of the projects completed. LDC has successfully completed projects which required data review capacity of as many as 2000 samples in one month.

### **Technical / Management Approach**

LDC has established data validation and data management procedures which enable the thorough, consistent, timely, and efficient review of analytical data. Ms. Stella Cuenco, principal chemist, is responsible for all data validation related activities and has final authority for the company. The designated Project Manager will coordinate the day to day data validation activities and interface with the Client project chemist or PM as necessary. For day to day data review activities, data validators report directly to the senior chemist in the section of the review. Senior chemists report to the technical project manager. Data validation will be performed following the Client project specific requirements as stated in the Scope of Work (SOW).

As the Client alerts LDC of in-coming SDGs and associated ADR EDDs, the LDC project manager will log the order into the up-coming project list identified as the "LDC Project Backlog" form. This is now considered a booked order and is reserved a place in the schedule. The project manager will allocate and schedule staff resources for the project. He will generate a project specific summary which will detail the expected receipt date of the order, the due date, special method or QC requirements, and the data quality objectives (DQOs) of the project.

Once the data packages arrive, the packages are logged in according to LDC SOP 6.0.0 "Standard Operating Procedure for Sample Data Log-in". Computer generated worksheets for each SDG along with the "LDC SDG Table" and "LDC Sample Validation" spreadsheet are distributed to all project staff.

The "LDC SDG Table" spreadsheet is specific to each order and provides the project manager with an overview of individual SDGs and their associated analyses. Progress of projects is indicated daily on the spreadsheet. The "LDC Sample Validation" spreadsheet identifies individual analysis requested for all samples and supports the data reviewer in verifying that appropriate samples have been reviewed in each data package. The previously discussed tools and processes have been used to successfully meet deadlines and estimate project completion dates. Meetings are held routinely to assess the status of each project.

Throughout the data review process, the project manager monitors project status as stated above. If any scheduling or technical complications arise such that the quality of the review will be impacted, data review staff notify the project manager immediately for resolution. The project manager will keep the Client chemist current on the progress of all validation activities on a



## **LABORATORY DATA CONSULTANTS, INC.**

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routine basis via e-mail and telephone. Once the data review worksheets have been completed and approved by a secondary review, the final technical reports are written. All final technical reports are reviewed by at least two senior staff. This may include the Technical Project Manager, QA Director, or Lead Chemist. Upon shipping the final report, the Client project chemist will be contacted by phone.





### **Data Review/Validation Process**

The data review and validation level of effort required for the Scope of Work outlined for this project will encompass several activities. The steps can be categorized in the following manner:

**1) Sample Log-in**

All samples submitted for data validation are entered into the LDC Log-in system. The system generates various spreadsheets for sample tracking, listings of laboratory and client identifications, sampling dates, analysis requested, matrix, and project due date. These tracking documents are distributed to all data validation, QA and project management staff.

**2) Pre-screening of Data Packages**

The pre-screening is performed concurrently with the sample log-in process. This task verifies sample chain-of-custody, data package completeness, and concurrence with the authorized delivery order.

**3) Data Validation**

The execution of the data review task requires the highest level of effort. The review process will be handled in a stepwise fashion including manual and automated data review. The validator will use manual review to document each finding on a Validation Findings form. Along with the finding, the reviewer will document the date of the occurrence, the lab reference identification, the validation criteria, the associated samples, and the qualification of the data. A Validation Checklist form is marked noting if validation criteria was met or exceeded. A Validation Checklist is enclosed for review (Exhibit A). These checklists are used as an inventory sheet to assure all samples were reviewed for each criteria. The findings documented on the Validation Findings form will be transcribed into the final summary report. Examples of recalculation and findings worksheets used for Level 4 validation are available for review upon request.

All initial validation performed by LDC has a secondary peer review. All final reports will be reviewed by a Senior Chemist or Principal Chemist.

**4) First Report Review**

The first review of the data validation report verifies that all findings and data qualification has been accurately transferred from the data validation worksheets. All sample identifications, methods, formatting, and general text are reviewed.

**5) Senior Report Review**

The senior review of the data validation report verifies that all findings, data qualification, and professional judgments previously integrated into the reports reflect the overall quality of the data. Any additional comments required to enhance the usability of the report will be inserted at this time.



**6) QA Report Review**

A QA check of selected data validation reports within an individual delivery order will be reviewed by the QA department. A formal nonconformance report will be generated for any identified deficiencies. The deficiency will be addressed with the appropriate staff and corrected prior to submittal to senior management for final review and signature.

**7) Senior Management Review**

The program/technical manager will perform an overall review of the final reports. He will sign the report cover letter and submit the report to the sample custodian for shipment to the client.

**8) Electronic Data Deliverables (EDD)**

This process will be initiated at step 1 with the receipt of files from the client or loading EDDs to LDC's secured Internet portal. After automated verification of the EDD format, content, and fields, the EDD will be populated with the manual review for importing of the final data qualifiers. The final approval of qualifiers will occur after step 5.

LDC will self-perform the above tasks to maintain quality and control of the work product.



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## Exhibit A

### VALIDATION COMPLETENESS WORKSHEET

EPA Level IV

LDC #: \_\_\_\_\_

SDG #: \_\_\_\_\_

Laboratory: \_\_\_\_\_

Date: \_\_\_\_\_

Page: \_\_\_\_\_ of \_\_\_\_\_

Reviewer: \_\_\_\_\_

2nd Reviewer: \_\_\_\_\_

**METHOD:** GC/MS VOA (EPA SW 846 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	/	
II.	GC/MS Instrument performance check		
III.	Initial calibration/ICV	/	
IV.	Continuing calibration		
V.	Laboratory Blanks		
VI.	Field blanks		
VII.	Surrogate spikes		
VIII.	Matrix spike/Matrix spike duplicates		
IX.	Laboratory control samples		
X.	Field duplicates		
XI.	Internal standards		
XII.	Compound quantitation RL/LOQ/LODs		
XIII.	Target compound identification		
XIV.	System performance		
XV.	Overall assessment of data		

Note: A = Acceptable  
N = Not provided/applicable  
SW = See worksheet

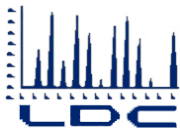
ND = No compounds detected  
R = Rinsate  
FB = Field blank

D = Duplicate  
TB = Trip blank  
EB = Equipment blank

SB=Source blank  
OTHER:

	Client ID	Lab ID	Matrix	Date
1				
2				
3				
4				
5				

Notes:

### **LDC Corporate Resources**

LDC personnel have experience and formal training in the areas of data validation, electronic data deliverables and laboratory QA/QC. LDC personnel have performed data validation in all analytical disciplines. These include, but are not limited to, GC/MS volatiles, GC volatiles, GC/MS semivolatiles, GC pesticides, ICP metals, ICP/MS metals, GFAA metals, GC petroleum hydrocarbons, GC/MS dioxins, explosives, radiochemistry, and wet chemistry. This versatility allows our organization to adapt to workload changes and allows for an excellent secondary review system. Our organization is structured to allow direct communication between project managers, data validators, and clerical staff which occurs on a daily basis.

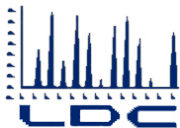
With LDC's 30+ years as a national leader in the data validation industry and extensive experience supporting projects with multiple EPA regions, DoD and DOE facilities, LDC is confident our data validation services will successfully meet all project requirements. The validation group is managed by Ms. Stella Cuenco, principal chemist, who has over 30 years of experience, the software products and services group is managed by Mr. Scott Denzer, who has over 40 years of experience, and the overall operations are directed by Mr. Michael Takaki, president.

The validation group is divided into chemists by discipline, organics (GC/MS, GC and HPLC) and inorganics (wet chemistry, IC, ICP, ICP/MS). All chemists report to senior group leads. A separate group performs data package log-in to the LDC tracking system. Another group performs the EDD population and verification. Judy Ecklund leads this group and has over 13 years of experience in EDD population, preparation, and uploading to various databases.

The majority of the data validation staff at LDC have been employed for over 10 years with some senior staff over 20 years as noted in the attached resumes. This level of stability and experience will ensure project stability and consistency.

In addressing LDC's financial status, LDC has an excellent Dun & Bradstreet report and has been profitable for the past 15 years. LDC has grown at approximately 10% in each of the past 5 years and continues to be a leader in our environmental sector of the data quality business. References are available from our vendors and clients to confirm our business success. Our annual revenue of approximately \$4,000,000 per year in data validation work makes LDC one of the largest independent data validation firms in the nation.

LDC will commit the resources and materials to successfully complete this project with the required time period and with a high level of quality.



**Project Team Summary**

LDC personnel have hands-on experience in the areas of data validation, laboratory QA/QC, CLP SOWs, and environmental laboratory analyses. As documented in the resumes of our staff, the project team has significant experience with USACE and DoD protocols, current technology, SW-846, and all methods stated in the SOW.

LDC is presenting the following staff to perform key roles for this contract. The key staff of the project team and their experience are as follows:

- **Stella Cuenco, Principal Chemist/Operations Manager**  
**Project Role: Principal Chemist/Program Manager**  
**Data Validation Experience: 26 years**  
**Overall Laboratory and Data Validation Experience: 32 years**  
B.S. Chemistry, University of the Philippines, 1991

Ms. Cuenco has over 32 years of environmental laboratory and data validation experience under DoD and EPA guidelines. Her experience includes performance of data validation in gas chromatography/mass spectrometry for volatile and semivolatile organics and extensive Navy and EPA data review and data verification for all organic and inorganic analyses. Her laboratory experience includes hands-on CLP and SW-846 GC/MS methods.

- **Pei Geng, Senior Chemist/Project Manager**  
**Project Role: Senior Organic Data Validator/Project Manager**  
**Data Validation Experience: 25 years**  
**Overall Laboratory and Data Validation Experience: 32 years**  
M.S. Chemistry, Sam Houston University, 1989

Ms. Geng will perform the role of day to day Project Manager for this project. She will monitor schedules, compliance of validation to the Required Guidelines, perform routine surveillance activities such as generation of non-conformance reports, validator training and QA reports to management.

Ms. Geng will perform the role of organic data validator for this project. She will perform data validation for GC/MS and gas chromatography analyses and serve as a peer reviewer in the initial validation review process.

Ms. Geng has over 31 years of environmental laboratory and data validation experience. Her experience includes performance of data validation in the gas chromatography area for volatile and semivolatile organics and extensive DoD data review and data verification for all organic analyses. Her laboratory experience includes hands-on CLP and SW-846 GC/MS methods.

- **Michael Giangjordano, Chemist/Project Manager**  
**Project Role: Project Management Assistance**  
**Data Validation Experience: 8 years**  
**Overall Laboratory and Data Validation Experience: 22 years**  
B.S. Kinesiology, pending, San Diego State University, San Diego, CA



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Mr. Giangiordano has 8 years of experience at LDC and specializes in supporting the company's custom software products. Mr. Giangiordano has a thorough knowledge and understanding of the company's branded software and has led numerous workshops and training sessions for clients ranging from laboratory personnel to consulting firms to USACE. He has extensive experience in electronic data deliverables and electronic data deliverable review and provides database support and management solutions for clients using LDC's custom environmental database management system (EDMSi).

Mr. Giangiordano has 14 years of environmental laboratory. His experience includes Project Manager at EnviroMatrix Analytical, Inc., an accredited full service environmental analytical chemistry facility, Mr. Giangiordano oversaw projects that provided analytical services and support to clients ranging from environmental consulting firms to marine biology firms, in addition to waste and wastewater treatment and disposal firms and municipalities. Mr. Giangiordano was also the Supervisor of the WET Chemistry and Microbiology Departments at EnviroMatrix Analytical, Inc. where he was responsible for all department functions which included overseeing daily operations, training staff, final reporting of analytical data, compliance with method requirements, as well as introducing and developing new methods for additional accreditation.

### **An Le, Inorganic Chemist**

**Project Role: Inorganic Data Validator**

**Data Validation Experience: 5 years**

**Overall Laboratory and Data Validation Experience: 23 years**

B.S. Biological Science, 2000, University of California, Irvine

Ms. Le has over 23 years combined environmental laboratory and data validation experience. Her experience includes performance of data validation using USEPA National Functional Guidelines, client Quality Assurance Program documents, and the Department of Defense QSM depending on the project requirements for the clients.

Ms. Le was a Wet Chemistry Analyst at TestAmerica Laboratories, Ms. Le performed analysis of an extensive list of wet chemistry analyses. Ms. Le also performed volatile organic compounds analysis according and was also responsible for training new analyst employees and performing second level review of data.

### **Judy Ecklund, EDD Specialist**

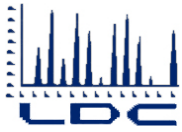
**Project Role: Electronic Data Entry (EDD)**

**EDD Experience: 14 years**

Ms. Ecklund specializes in Electronic Data Deliverables and is familiar with a variety of deliverable formats, including but not limited to NEDD, EQUIS, and SEDD. Ms. Ecklund is also an expert in submitting data to NIRIS the Navy database.

Ms. Ecklund has over 31 years combined environmental laboratory and validation related experience. Her experience includes working with electronic data deliverables (EDDs) as well as performing database uploads.

- **Tony Rommelfanger, Data Control Manager**  
**Project Role: Data Custodian**



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Mr. Rommelfanger will perform the role of data custodian for this project. He will perform the log-in of all data packages into the LDC tracking system. This system will generate spreadsheets for identifying all samples, their collection date, analysis performed, matrix, and report due date. Upon the completion of each delivery order, he will archive and catalog all reports and data in a secured storage area.

Mr. Rommelfanger has over 31 years of experience in laboratory and data management experience. He has experience in organizing, logging in, and tracking data packages for technical staff.



## **Resumes of Key Staff**

- Stella Cuenco, Senior Chemist
- Pei Geng, Senior Chemist
- Michael Giangjordano, Chemist
- An Le, Inorganic Chemist





RESUME  
STELLA S. CUENCO

EDUCATION

B.S. Chemistry, 1991  
University of the Philippines (UP)

PROFESSIONAL HISTORY

Laboratory Data Consultants, Inc.  
Senior Chemist  
1996 to present

Ceimic Corporation  
GC/MS Chemist  
1996

Analytical Technologies, Inc.  
GC/MS VOA Group Leader  
1992 to 1996

Analytical Technologies, Inc.  
GC/MS Chemist  
1991 to 1992

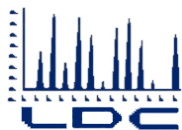
Natural Products Research, UP  
Research Assistant  
1990 to 1991

REPRESENTATIVE EXPERIENCE

Ms. Cuenco has over 32 years combined environmental laboratory and data validation experience. Her experience includes performance of data validation in the GC and GC/MS areas for major Federal projects. She has performed large validation projects under Boeing, Navy Southwest, Northwest and Pacific Division, EPA Region IX ESAT, USACE and AFCEE/AFCEC programs. Her laboratory experience includes hands-on CLP and EPA analysis of GC and GC/MS volatile organic compounds.

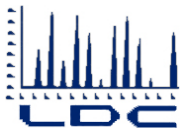
Specifically, Ms. Cuenco has over 26 years organic data validation experience using USEPA (including Region III) functional guidelines and other applicable documents.

- As senior chemist with LDC, Ms. Cuenco specializes in the data validation and contract compliance screening of gas chromatography-mass spectrometry analyses as well as gas chromatography analyses. She has a thorough knowledge and understanding of gas chromatography and gas chromatography-mass spectrometry (GCMS) and high resolution GCMS methods referenced in EPA CLP, SW-846, EPA 500, 600 and 1600 series documents. She has performed large data validation under Boeing, Navy Southwest and Pacific Divisions and EPA Region IX ESAT, USACE and AFCEE/AFCEC projects.



Ms. Cuenco has over 6 years experience in an environmental laboratory performing the analysis of organic parameters.

- As GC/MS chemist at Ceimic Corporation, a full service environmental analytical chemistry facility, Ms. Cuenco performed GC and GC/MS volatile analyses. She was responsible for the final reporting of analytical data for this section.
- As GC/MS VOA Group Leader at Analytical Technologies Inc., a full service environmental analytical chemistry facility, Ms. Cuenco was responsible for all GC/MS functions which included overseeing daily operations, training staff, final reporting of analytical data, and compliance with method requirements.
- As research assistant at Natural Products Research, UP, Ms. Cuenco researched chemical literature for plants with known medicinal properties as well as performed microbiological and pharmacological tests on plant extracts.



RESUME  
PEI GENG

EDUCATION

M.S. Organic Chemistry, 1989  
Sam Houston State University

B.S. Environmental Chemistry, 1983  
Nankai University

PROFESSIONAL HISTORY

Laboratory Data Consultants, Inc.  
Senior Chemist  
1997 to present

Ceimic Corporation  
GC/MS and GC Chemist  
1996 to 1997

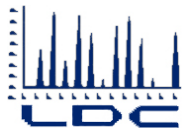
PACE Analytical Service Inc.  
GC/MS and GC Chemist  
1990 to 1996

REPRESENTATIVE EXPERIENCE

Ms. Geng has over 32 years combined environmental laboratory and data validation experience. Her experience includes performance of data validation in the GC and GC/MS areas for major Federal projects. She has performed large validation projects under Boeing, Navy Southwest, Northwest and Pacific Division, EPA Region IX ESAT, USACE and AFCEE/AFCEC programs. Her laboratory experience includes hands-on CLP and EPA analysis of GC and GC/MS volatile organic compounds.

Specifically, Ms. Geng has over 25 years organic data validation experience using USEPA CLP (including Region III) functional guidelines and other applicable documents.

- As chemist with LDC, Ms. Geng specializes in the data validation and contract compliance screening of gas chromatography-mass spectrometry analyses as well as gas chromatography analyses. She has a thorough knowledge and understanding of gas chromatography and gas chromatography-mass spectrometry (GCMS) and high resolution GCMS methods referenced in EPA CLP, SW-846, EPA 500, 600 and 1600 series documents. She has performed large data validation under Boeing, Navy Southwest and Pacific Divisions and EPA Region IX ESAT, USACE and AFCEE/AFCEC projects.



Ms. Geng has over 7 years of experience in an environmental laboratory performing the analysis of organic parameters.

- As both a GC and GC/MS chemist at Ceimic Corporation, a full service environmental analytical chemistry facility, Ms. Geng performed GC and GC/MS volatile and semivolatile analyses.
- As both a GC and GC/MS chemist at PACE Analytical Service Inc., a full service environmental analytical chemistry facility, Ms. Geng performed GC and GC/MS volatile and semivolatile analyses as well as overseeing the final reporting of analytical data, and compliance with method requirements.



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### **RESUME MICHAEL D. GIANGIORDANO**

#### **EDUCATION**

B.S. Kinesiology, pending  
San Diego State University, San Diego, CA

#### **PROFESSIONAL HISTORY**

Laboratory Data Consultants, Inc.  
Sr. Environmental Informatics & Software Support Specialist  
2016 to present

EnviroMatrix Analytical, Inc.  
Project Manager  
2005-2015

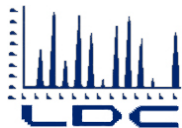
Laboratory Supervisor  
2003 to 2015

Laboratory Technician  
2001 to 2003

#### **REPRESENTATIVE EXPERIENCE**

Mr. Giangiordano has over 22 years combined environmental laboratory and data management experience and possesses certifications as a Project Management Professional (PMP) and Scrum Master as well as a Laboratory Analyst. Mr. Giangiordano came to Laboratory Data Consultants, Inc. with over 14 years of hands-on environmental laboratory experience at an accredited full service environmental analytical chemistry facility and now specializes in supporting the company's custom software products.

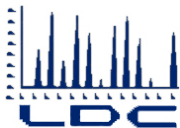
- As Senior Environmental Informatics & Software Support Specialist with LDC, Mr. Giangiordano has a thorough knowledge and understanding of the company's branded software and has led numerous workshops and training sessions for clients ranging from laboratory personnel to consulting firms to USACE. Mr. Giangiordano specializes in tending to client software and electronic data deliverable needs and provides technical support throughout the life of LDC's various custom software products. He has extensive experience in electronic data deliverables and electronic data deliverable review and provides database support and management solutions for clients using LDC's custom environmental database management system (EDMSi).
- As a Project Manager at EnviroMatrix Analytical, Inc., an accredited full service environmental analytical chemistry facility, Mr. Giangiordano oversaw projects that provided analytical services and support to clients ranging from environmental consulting firms to marine biology firms, in addition to waste and wastewater treatment and disposal firms and municipalities. During this time, Mr. Giangiordano also served as liaison to US military in designing a wastewater compliance infrastructure that decreased analytical reporting limits and increased equipment capabilities



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- As Supervisor of the WET Chemistry and Microbiology Departments at EnviroMatrix Analytical, Inc., Mr. Giangiordano was responsible for all department functions which included overseeing daily operations, training staff, final reporting of analytical data, compliance with method requirements, as well as introducing and developing new methods for additional accreditation.
- As an analytical chemist and microbiologist, Mr. Giangiordano performed the analysis of inorganic constituents and bacteriological contamination in drinking water, wastewater, soil, tissue, and sediment and was responsible for the final reporting of analytical data for these sections.



RESUME  
AN LE

EDUCATION

B.S. Biological Science, 2000  
University of California, Irvine

PROFESSIONAL HISTORY

Laboratory Data Consultants, Inc.  
Senior Chemist  
Feb 2017 to present

TestAmerica Analytical Inc., Irvine, CA  
GCMS Analyst  
2007 to 2017

EMSL Analytical Inc.  
Industrial Hygiene Analyst  
2006 to 2007

TestAmerica Analytical Inc., Irvine, CA  
Wet Chemistry Analyst  
2000 to 2006

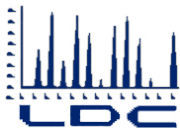
REPRESENTATIVE EXPERIENCE

Ms. Le has 6 years of data validation experience.

- As a chemist at LDC, Ms. Le has performed data validation using USEPA National Functional Guidelines, client Quality Assurance Program documents, and the Department of Defense QSM depending on the project requirements for the clients.

Ms. Le has over 17 years of experience working in the lab and performing secondary data review in environmental testing field.

- As a Wet Chemistry Analyst at TestAmerica Laboratories, Ms. Le performed an extensive list of wet chemistry analyses including but not limited to Total Organic Carbon, pH, Conductivity, Biological Oxygen Demand, Total Dissolved Solids, Total Suspend Solids, Alkalinity, and Carbon Dioxide. Ms. Le has also performed Ion Chromatography analysis for Nitrite, Nitrate, Phosphate, Perchlorate, Chromium VI, and used the Spectrophotometer to analyze for Sulfide, Phenol, Chromium VI, Chemical Oxygen Demand (COD), Sulfactants (MBAS), Phosphorous, and Cyanide. As a Gas Chromatography Mass Spectrometry (GCMS) analyst, Ms. Le performed volatile organic compounds analysis according to methods 8260, 5030, 5035, and 624. Ms. Le was also responsible for training new analyst employees and performing second level review of data.
- At EMSL Analytical Inc., Ms. Le performed sample extraction and analysis of samples for metals using inductively coupled plasma (ICP) and flame atomic absorption (GFAA).



**Relevant Project Experience**

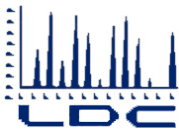
LDC has performed data validation and Quality Assurance services for contaminated sites overseen by AFCEE/AFCEC, Navy Southwest Division, DoE, DoD, EPA Superfund projects overseen by EPA Regions II, III, IV, IX, X, Brown Fields Cleanup for NY Sites, USACE projects reviewed by the Alaska, Baltimore, Louisville, Albuquerque, Seattle, Philadelphia, and Sacramento Districts, and Navy projects reviewed by NFESC.

LDC is the software developer and expert in the use of the Automated Data Review (ADR) software. LDC has been using the ADR.NET version and has the current Version in full implementation. LDC has performed over 1000 ADR projects in the past 10 years' worth over \$2,000,000 in revenue. ADR clients include, but are not limited to: Tetra Tech EC, Sealaska, AMEC, EPA, California DTSC, MWH, Trevet, Brown & Caldwell, AECOM, Shaw, ITSI, CDM, Weston Solutions and the San Gabriel Watermaster.

LDC has validated over 1,000,000 samples for analyses such as volatile organics (CLP, EPA Method 8240/8260), semivolatile organics (CLP, EPA Method 8270), organochlorine pesticides/PCBs (CLP, EPA Method 8081/8082), chlorinated herbicides (EPA Method 8151), purgeable halocarbons and aromatics (EPA Method 8021), trace metals (CLP, EPA Method 6010/6020/7000), PAHs by EPA 8310 and 8270, TOC analyses, hexavalent chromium, total petroleum hydrocarbons (EPA Method 8015/CDOHS LUFT), radiochemical constituents including gross alpha/beta, alpha spec, gamma spec, tritium, and uranium, and general minerals.

LDC has met their contractual turnaround time and quality requirements on over 99% of the projects completed.





## **LABORATORY DATA CONSULTANTS, INC.**

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### **LDC Company Information**

- Primary NAICS Code 541380 (also 541690 and 541620)
- TIN# 33-0492643
- DUNS# 789643863
- Cage Code 04XK8, UEI# PEK5K6KMDYV1
- MBE (CPUC Certified)
- SBE (Port of Long Beach, California eProcure, and LAUSD Certified) Less than 50 Employees
- Registered in ORCA and SAM
- CA PWCR Registration # 1000047894
- LAUSD Vendor ID# 1000018015
- South Florida Water Management District SBE Vendor 105004
- New York State Vendor ID number 1100182981
- New York City PIP Vendor number VS00046623
- New Jersey State Vendor ID number V00026481

### **Project Management**

- LDC will dedicate Ms. Stella Cuenco, Principal Chemist, as the overall program manager and Ms. Pei Geng as the project manager.

We appreciate the opportunity to support your company on this project and we look forward to working together in the future. Please feel free to call me at (760) 827-1100 if you have any questions after your review.

Sincerely,

Laura Soeten  
Executive Administrator  
Lsoeten@lab-data.com

## APPENDIX K

### SITE MANAGEMENT FORMS

#### Summary of Green Remediation Metrics for Site Management

Site Name: \_\_\_\_\_ Site Code: \_\_\_\_\_  
 Address: \_\_\_\_\_ City: \_\_\_\_\_  
 State: \_\_\_\_\_ Zip Code: \_\_\_\_\_ County: \_\_\_\_\_

#### Initial Report Period (Start Date of period covered by the Initial Report submittal)

Start Date: \_\_\_\_\_

#### Current Reporting Period

Reporting Period From: \_\_\_\_\_ To: \_\_\_\_\_

#### Contact Information

Preparer's Name: \_\_\_\_\_ Phone No.: \_\_\_\_\_

Preparer's Affiliation: \_\_\_\_\_

**I. Energy Usage:** Quantify the amount of energy used directly on-site and the portion of that derived from renewable energy sources.

	Current Reporting Period	Total to Date
Fuel Type 1 (e.g. natural gas (cf))		
Fuel Type 2 (e.g. fuel oil, propane (gals))		
Electricity (kWh)		
<b>Of that Electric usage, provide quantity:</b>		
Derived from renewable sources (e.g. solar, wind)		
<b>Other energy sources</b> (e.g. geothermal, solar thermal (Btu))		

*Provide a description of energy usage reduction programs for the Site in the space provided on Page 3.*

**II. Solid Waste Generation:** Quantify the management of solid waste generated on-site.

	Current Reporting Period (tons)	Total to Date (tons)
<b>Total waste generated on-site</b>		
OM&M generated waste		
<b>Of that total amount, provide quantity:</b>		

Transported off-site to landfills		
Transported off-site to other disposal facilities		
Transported off-site for recycling/reuse		
Reused on-site		

*Provide a description of implemented waste reduction programs for the Site in the space provided on Page 3.*

**III. Transportation/Shipping:** Quantify the distances travelled for delivery of supplies and lab-supplied bottles, shipping of laboratory samples, and the removal of waste.

	<b>Current Reporting Period (miles)</b>	<b>Total to Date (miles)</b>
Standby Engineer/Contractor		
Laboratory Courier/Delivery Service (bottle and sample delivery)		
Waste Removal/Hauling		

*Provide a description of mileage reduction programs for the Site in the space provided on Page 3. Include specifically local vendor/services utilized that are within 50 miles of the Site.*

**IV. Water Usage:** Quantify the volume of water used on-site from various sources.

	<b>Current Reporting Period (gallons)</b>	<b>Total to Date (gallons)</b>
Total quantity of water used on-site (not including treated water)		
<b>Of that total amount, provide quantity:</b>		
Public potable water supply usage		
Surface water usage		
On-site groundwater usage		
Collected or diverted storm water usage		

*Provide a description of implemented water consumption reduction programs for the Site in the space provided on Page 3.*

**V. Land Use and Ecosystems:** Quantify the amount of land and/or ecosystems disturbed and the area of land and/or ecosystems restored to a pre-development condition (i.e. Green Infrastructure).

	<b>Current Reporting Period (acres)</b>	<b>Total to Date (acres)</b>
Land disturbed		
Land restored		

*Provide a description of implemented land restoration/green infrastructure programs for the Site in the space provided on Page 3.*

<b>Description of green remediation programs reported above</b> (Attach additional sheets if needed)
Energy Usage:
Waste Generation:
Transportation/Shipping:
Water usage:
Land Use and Ecosystems:
Recommendations/Other:

<b>CONTRACTOR CERTIFICATION</b>	
I, _____ (Name) do hereby certify that I am _____ (Title) of _____ (Contractor Name), which is responsible for the work documented on this form. According to my knowledge and belief, the information provided in this form is accurate and the Site management program complies with the DER-10, DER-31, and CP-49 policies.	
_____	_____
<b>Date</b>	<b>Contractor</b>

## **APPENDIX L**

### **GREEN REMEDIATION EVALUATION CALCULATIONS**

### Environmental Footprint Summary

Core Element	Metric		Unit of Measure	Footprint						
				Site Wide Inspection	Post-Remediation Monitoring & Sampling - SSDS - Y1	Post-Remediation Monitoring & Sampling - SVE - Y1	< Component 4 >	< Component 5 >	< Component 6 >	Total
Materials & Waste	M&W-1	Refined materials used on-site	Tons	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	M&W-2	% of refined materials from recycled or reused material	%		0.0%					0.0%
	M&W-3	Unrefined materials used on-site	Tons	0.000	0.000	0.000	0.000	0.000	0.000	0.0
	M&W-4	% of unrefined materials from recycled or reused material	%							
	M&W-5	On-site hazardous waste disposed of off-site	Tons	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	M&W-6	On-site non-hazardous waste disposed of off-site	Tons	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	M&W-7	Recycled or reused waste	Tons	0.0	0.0	0.4	0.0	0.0	0.0	0.4
	M&W-8	% of total potential waste recycled or reused	%		0.0%	100.0%				99.4%
Water (used on-site)	W-1	Public water use	MG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	W-2	Groundwater use	MG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	W-3	Surface water use	MG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	W-4	Reclaimed water use	MG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	W-5	Storm water use	MG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	W-6	User-defined water resource #1	MG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	W-7	User-defined water resource #2	MG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	W-8	Wastewater generated	MG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Energy	E-1	Total energy used (on-site and off-site)	MMBtu	0.1	92.7	141.9	0.0	0.0	0.0	234.6
	E-2	Energy voluntarily derived from renewable resources								
	E-2A	On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation	MMBtu	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	E-2B	Voluntary purchase of renewable electricity	MWh	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	E-3	Voluntary purchase of RECs	MWh	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	E-4	On-site grid electricity use	MWh	0.000	7.406	11.109	0.000	0.000	0.000	18.5
Air	A-1	On-site NOx, SOx, and PM emissions	Pounds	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	A-2	On-site HAP emissions	Pounds	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	A-3	Total NOx, SOx, and PM emissions	Pounds	0.0	41.7	64.3	0.0	0.0	0.0	106.0
	A-3A	Total NOx emissions	Pounds	0.0	16.6	25.3	0.0	0.0	0.0	41.9
	A-3B	Total SOx emissions	Pounds	0.0	24.0	37.1	0.0	0.0	0.0	61.1
	A-3C	Total PM emissions	Pounds	0.0	1.1	1.8	0.0	0.0	0.0	2.9
	A-4	Total HAP emissions	Pounds	0.0	0.7	1.4	0.0	0.0	0.0	2.1
	A-5	Total greenhouse gas emissions	Tons CO2e*	0.0	2.0	3.2	0.0	0.0	0.0	5.2
Land & Ecosystems		Qualitative Description								

\* Total greenhouse gases emissions (in CO2e) include consideration of CO2, CH4, and N2O (Nitrous oxide) emissions.

"MMBtu" = millions of Btus

"MG" = millions of gallons

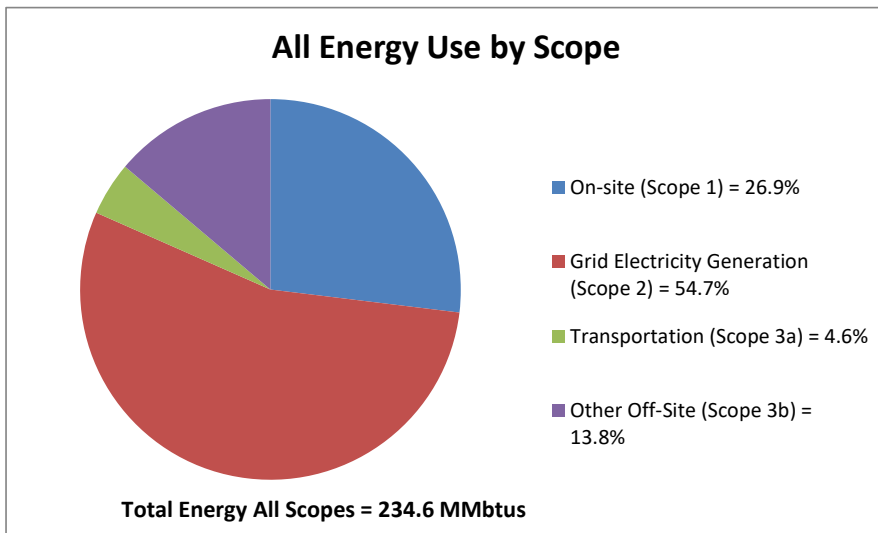
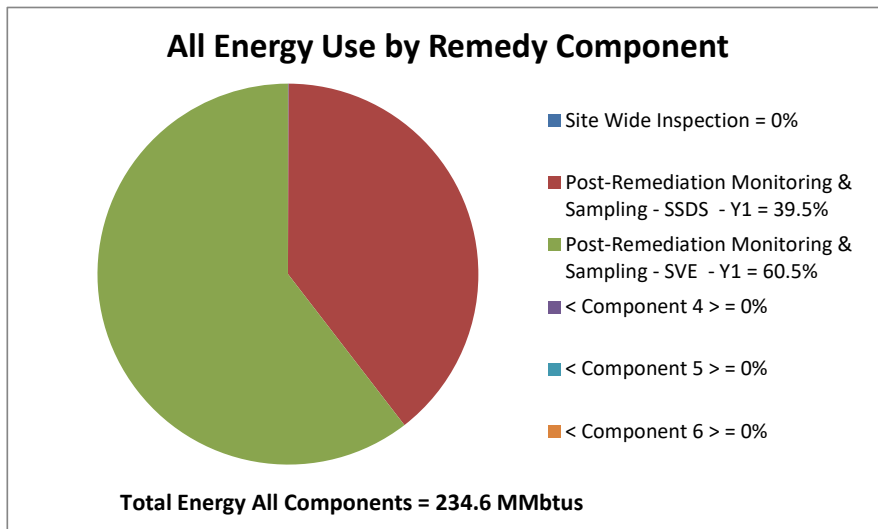
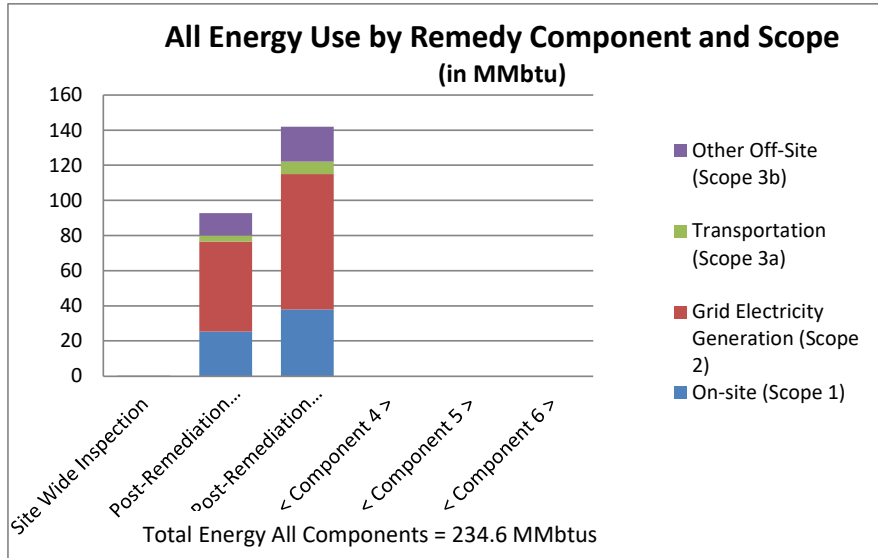
"CO2e" = carbon dioxide equivalents of global warming potential

"MWh" = megawatt hours (i.e., thousands of kilowatt-hours or millions of Watt-hours)

"Tons" = short tons (2,000 pounds)

The above metrics are consistent with EPA's Methodology for Understanding and Reducing a Project's Environmental Footprint (EPA 542-R-12-002), February 2012

Notes:





Total Energy MMbtus	Site Wide	Post-Reme	Post-Reme	< Compon	< Compon	< Compon	Total	
On-site (Scope 1)	0.0	25.3	37.9	0.0	0.0	0.0	63.2	
Electricity Generation (Scope 2)	0.0	51.3	77.0	0.0	0.0	0.0	128.3	d Electricity
Transportation (Scope 3a)	0.1	3.4	7.2	0.0	0.0	0.0	10.7	Trar
Other Off-Site (Scope 3b)	0.0	12.7	19.8	0.0	0.0	0.0	32.5	Oth
Total	0.1	92.7	141.9	0.0	0.0	0.0	234.6	

Site Wide Inspection = 0%

On-site (Scope 1) = 26.9%

Post-Remediation Monitoring & Sampling - SGrid Electricity Generation (Scope 2) = 54.7%

Post-Remediation Monitoring & Sampling - STransportation (Scope 3a) = 4.6%

< Component 4 > = 0%

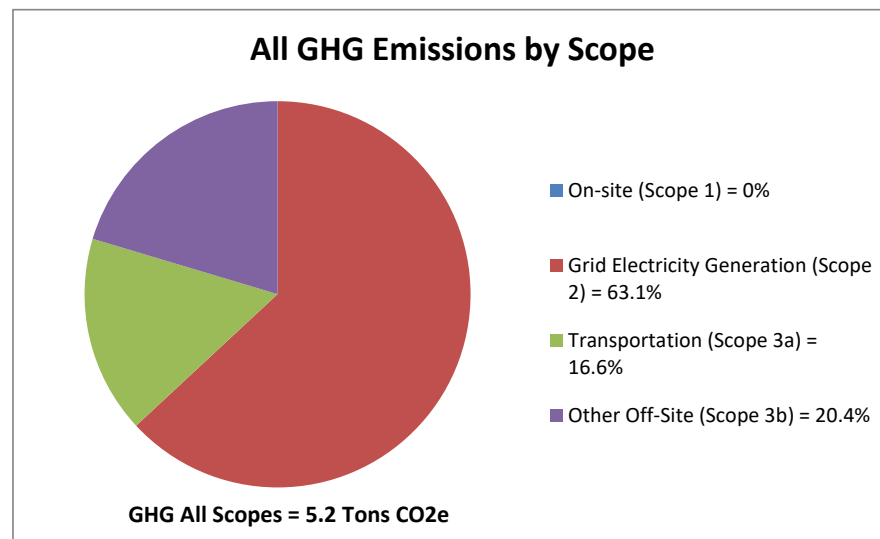
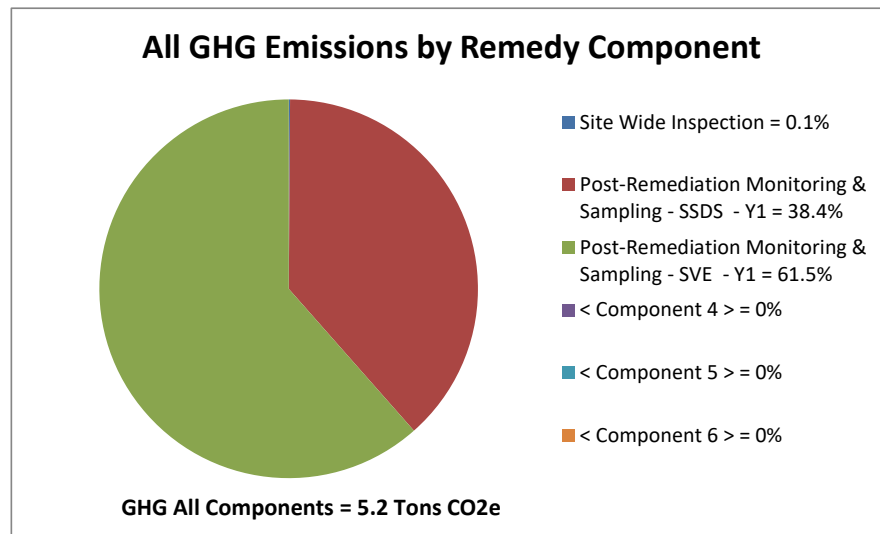
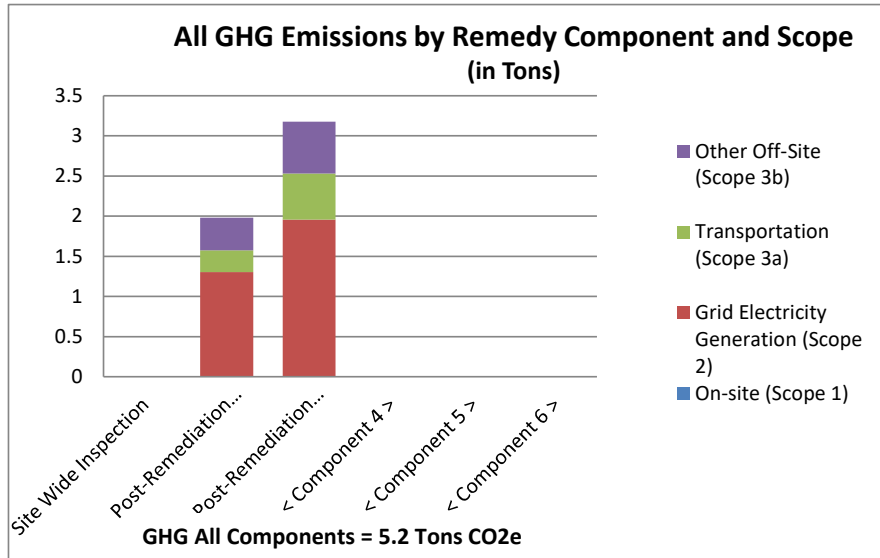
Other Off-Site (Scope 3b) = 13.8%

< Component 5 > = 0%

< Component 6 > = 0%

Total Energy All Components = 234.6 MMBtus

Total Energy All Scopes = 234.6 MMBtus



GHG									
Tons CO2e									
		Site Wide	Post-Reme	Post-Reme	< Compon	< Compon	< Compon	Total	
On-site (Scope 1)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Generation (Scope 2)		0.0	1.3	2.0	0.0	0.0	0.0	3.3	d Electricity
Transportation (Scope 3a)		0.0	0.3	0.6	0.0	0.0	0.0	0.9	Trar
Other Off-Site (Scope 3b)		0.0	0.4	0.6	0.0	0.0	0.0	1.1	Oth
Total		0.0	2.0	3.2	0.0	0.0	0.0	5.2	

Site Wide Inspection = 0.1%

On-site (Scope 1) = 0%

Post-Remediation Monitoring & Sampling - SGrid Electricity Generation (Scope 2) = 63.1%

Post-Remediation Monitoring & Sampling - STransportation (Scope 3a) = 16.6%

< Component 4 > = 0%

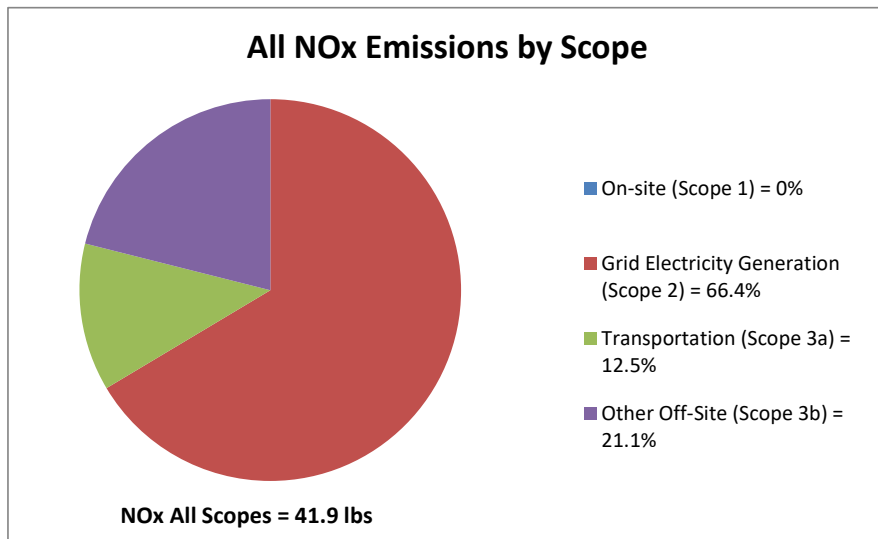
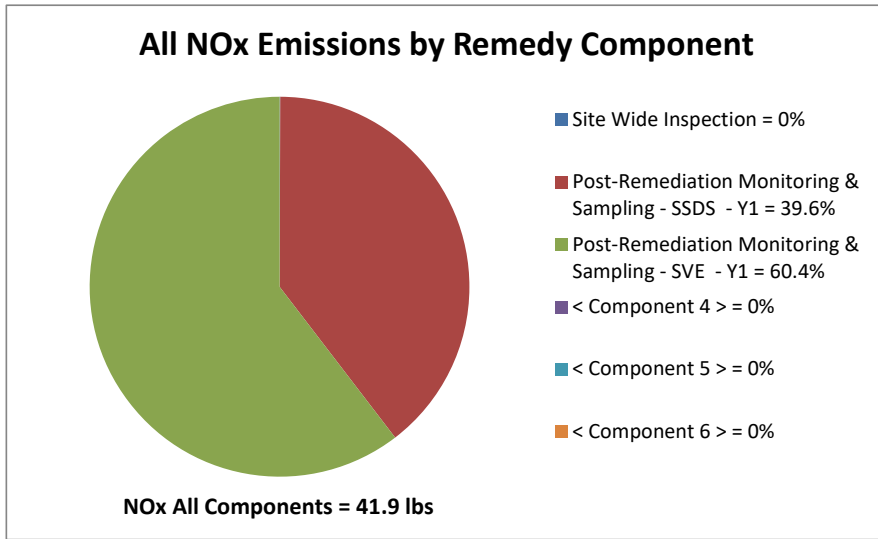
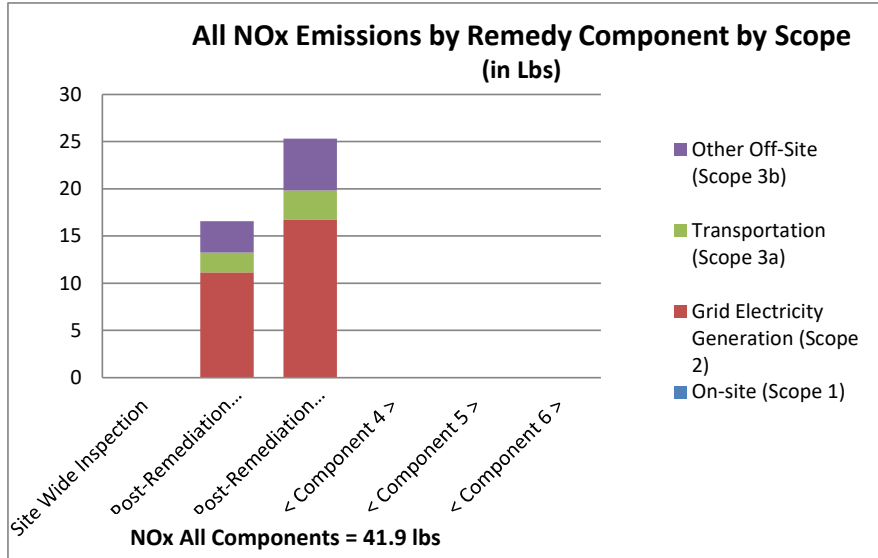
Other Off-Site (Scope 3b) = 20.4%

< Component 5 > = 0%

< Component 6 > = 0%

GHG All Components = 5.2 Tons CO2e

GHG All Scopes = 5.2 Tons CO2e



	NOx lbs							
	Site Wide	Post-Reme	Post-Reme	< Compon	< Compon	< Compon	Total	
On-site (Scope 1)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Generation (Scope 2)	0.0	11.1	16.7	0.0	0.0	0.0	27.8	d Electricity
Transportation (Scope 3a)	0.0	2.1	3.1	0.0	0.0	0.0	5.2	Trar
Other Off-Site (Scope 3b)	0.0	3.3	5.5	0.0	0.0	0.0	8.8	Oth
Total	0.0	16.6	25.3	0.0	0.0	0.0	41.9	

Site Wide Inspection = 0%

On-site (Scope 1) = 0%

Post-Remediation Monitoring & Sampling - SGrid Electricity Generation (Scope 2) = 66.4%

Post-Remediation Monitoring & Sampling - STransportation (Scope 3a) = 12.5%

< Component 4 > = 0%

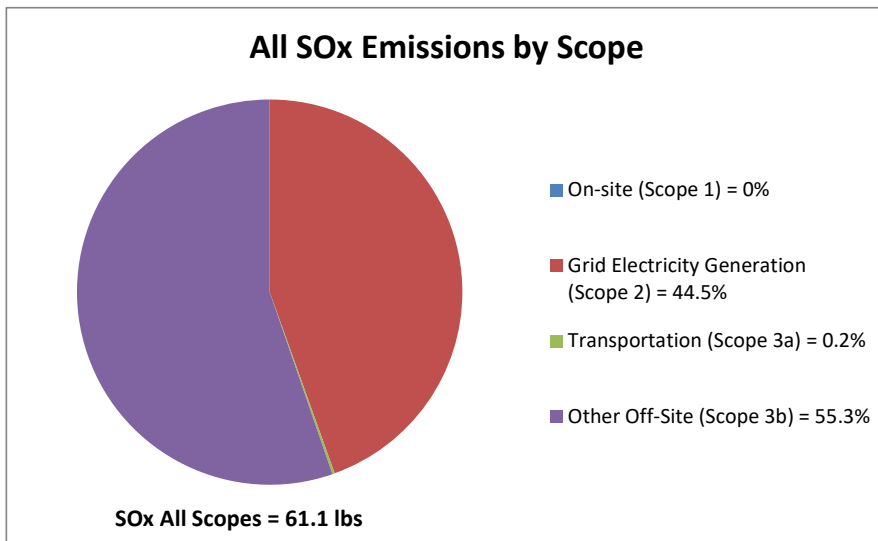
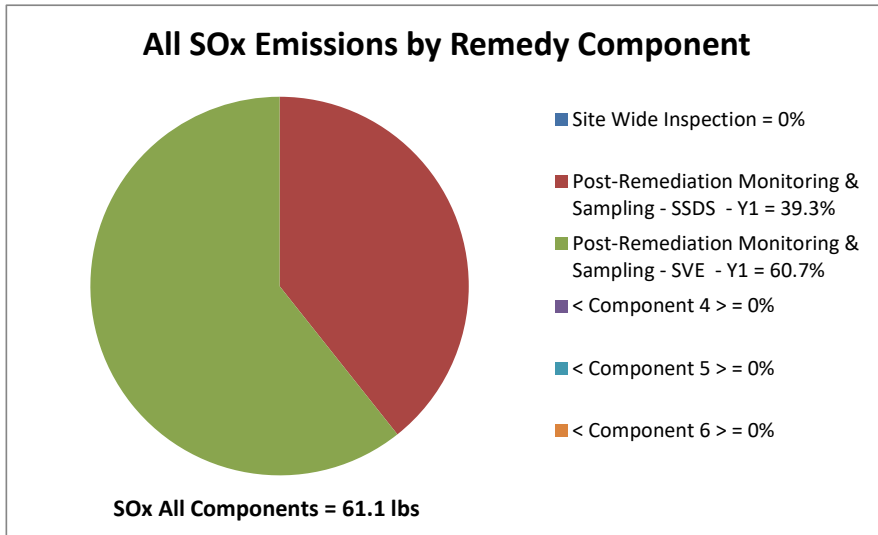
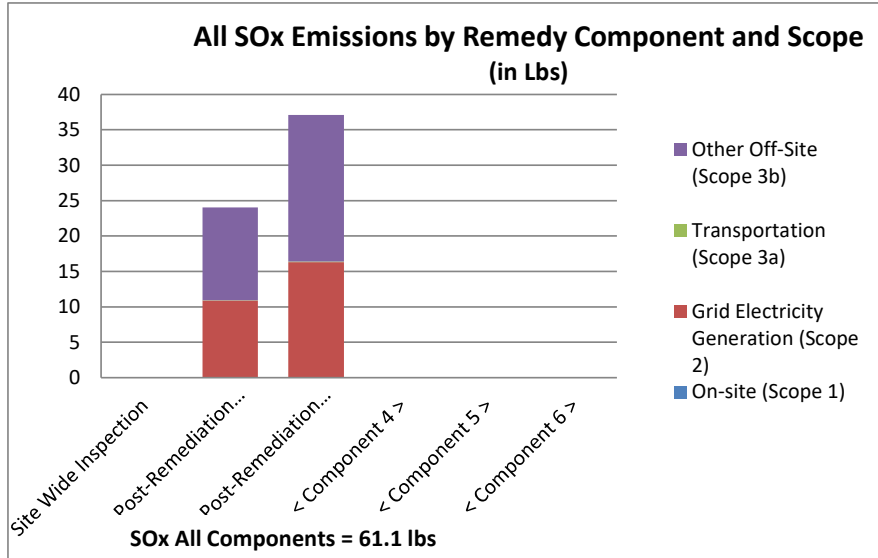
Other Off-Site (Scope 3b) = 21.1%

< Component 5 > = 0%

< Component 6 > = 0%

NOx All Components = 41.9 lbs

NOx All Scopes = 41.9 lbs



SOx lbs	Site Wide	Post-Reme	Post-Reme	< Compon	< Compon	< Compon	Total	
On-site (Scope 1)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Generation (Scope 2)	0.0	10.9	16.3	0.0	0.0	0.0	27.2	d Electricity
Transportation (Scope 3a)	0.0	0.1	0.1	0.0	0.0	0.0	0.1	Trar
Other Off-Site (Scope 3b)	0.0	13.1	20.7	0.0	0.0	0.0	33.8	Oth
Total	0.0	24.0	37.1	0.0	0.0	0.0	61.1	

Site Wide Inspection = 0%

On-site (Scope 1) = 0%

Post-Remediation Monitoring & Sampling - SGrid Electricity Generation (Scope 2) = 44.5%

Post-Remediation Monitoring & Sampling - STransportation (Scope 3a) = 0.2%

< Component 4 > = 0%

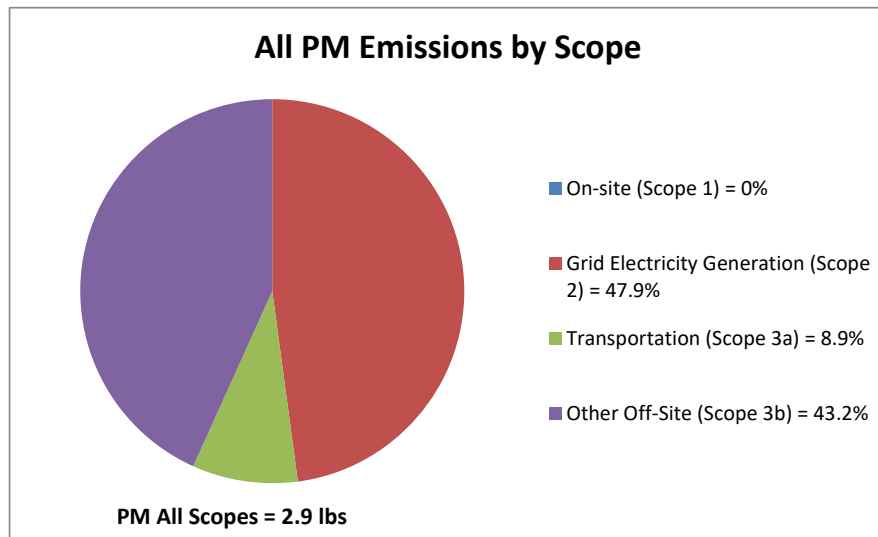
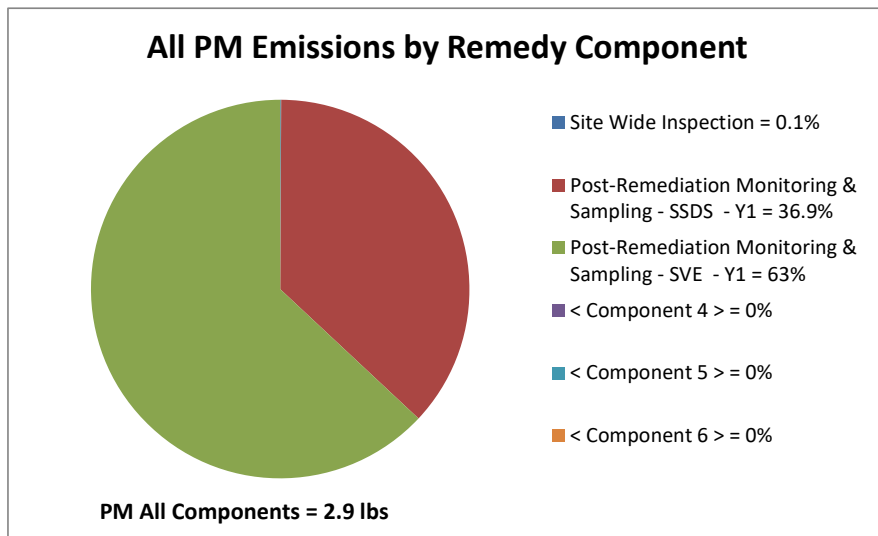
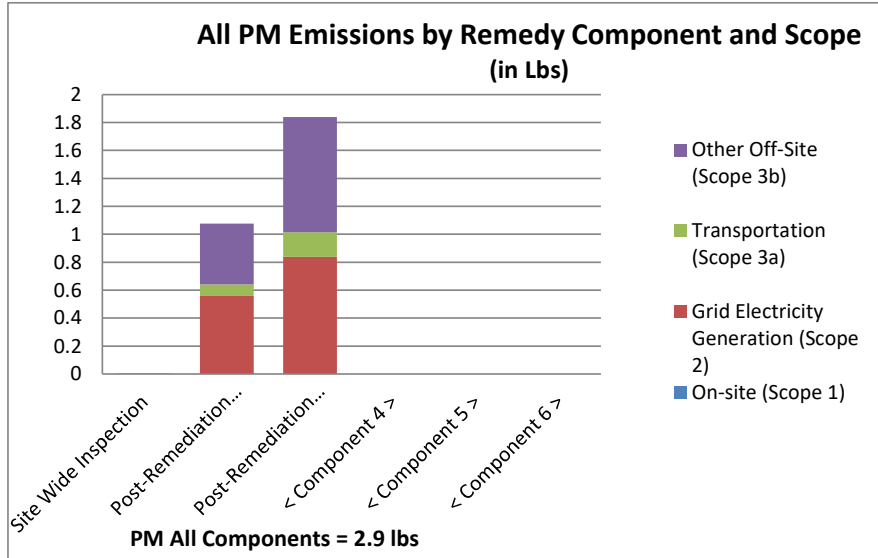
Other Off-Site (Scope 3b) = 55.3%

< Component 5 > = 0%

< Component 6 > = 0%

SOx All Components = 61.1 lbs

SOx All Scopes = 61.1 lbs





	PM							
	lbs	Site Wide	Post-Reme	Post-Reme	< Compon	< Compon	< Compon	Total
On-site (Scope 1)		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Generation (Scope 2)		0.0	0.6	0.8	0.0	0.0	0.0	1.4 d Electricity
Transportation (Scope 3a)		0.0	0.1	0.2	0.0	0.0	0.0	0.3 Trar
Other Off-Site (Scope 3b)		0.0	0.4	0.8	0.0	0.0	0.0	1.3 Oth
Total		0.0	1.1	1.8	0.0	0.0	0.0	2.9

Site Wide Inspection = 0.1%

On-site (Scope 1) = 0%

Post-Remediation Monitoring & Sampling - SGrid Electricity Generation (Scope 2) = 47.9%

Post-Remediation Monitoring & Sampling - STransportation (Scope 3a) = 8.9%

< Component 4 > = 0%

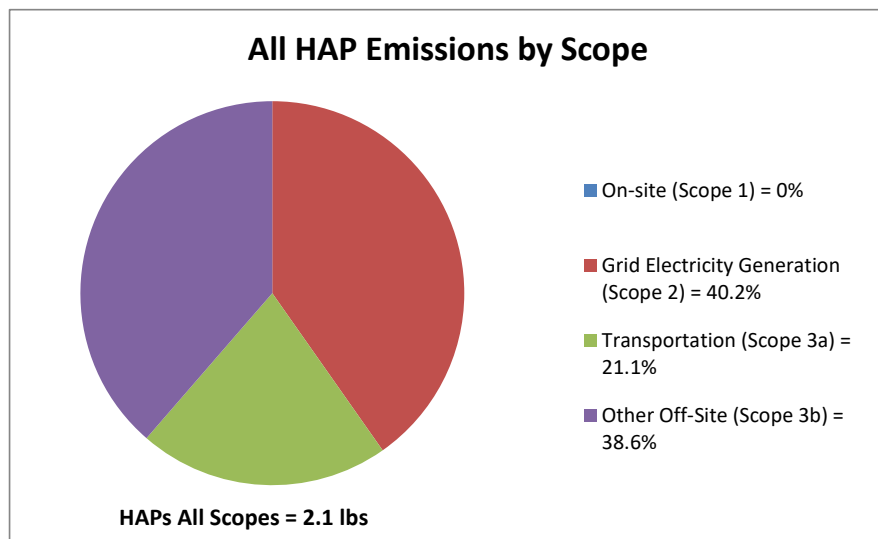
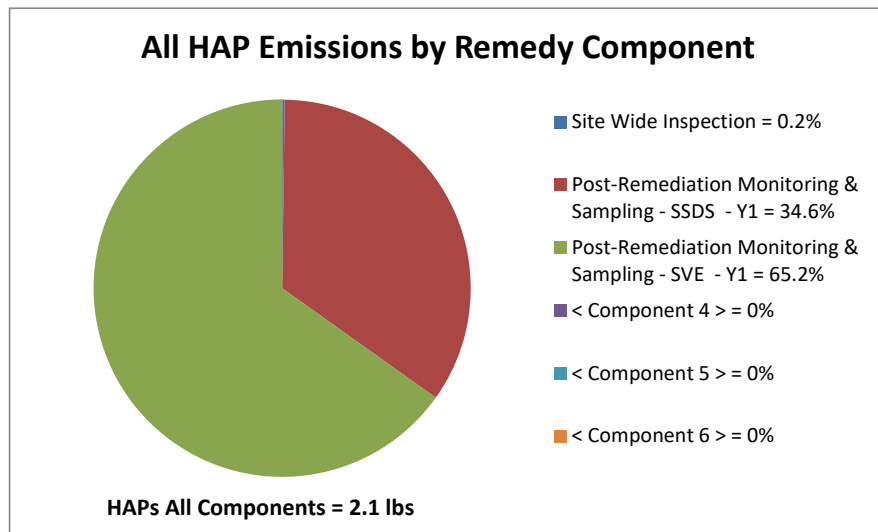
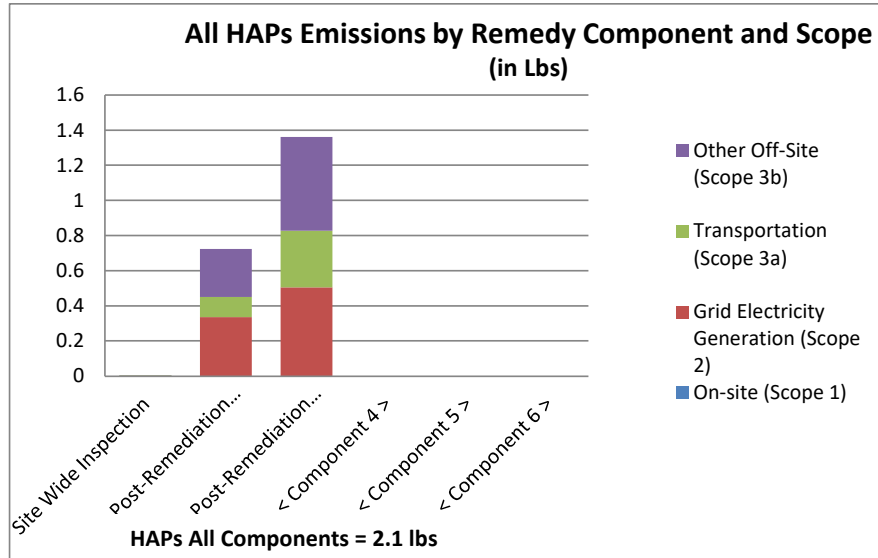
Other Off-Site (Scope 3b) = 43.2%

< Component 5 > = 0%

< Component 6 > = 0%

PM All Components = 2.9 lbs

PM All Scopes = 2.9 lbs



	HAPs lbs						
	Site Wide	Post-Reme	Post-Reme	< Compon	< Compon	< Compon	Total
On-site (Scope 1)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Generation (Scope 2)	0.0	0.3	0.5	0.0	0.0	0.0	0.8
Transportation (Scope 3a)	0.0	0.1	0.3	0.0	0.0	0.0	0.4
Other Off-Site (Scope 3b)	0.0	0.3	0.5	0.0	0.0	0.0	0.8
Total	0.0	0.7	1.4	0.0	0.0	0.0	2.1

Site Wide Inspection = 0.2%

On-site (Scope 1) = 0%

Post-Remediation Monitoring & Sampling - SGrid Electricity Generation (Scope 2) = 40.2%

Post-Remediation Monitoring & Sampling - STransportation (Scope 3a) = 21.1%

< Component 4 > = 0%

Other Off-Site (Scope 3b) = 38.6%

< Component 5 > = 0%

< Component 6 > = 0%

HAPs All Components = 2.1 lbs

HAPs All Scopes = 2.1 lbs

## **APPENDIX M**

### **REMEDIAL SYSTEM OPTIMIZATION TABLE OF CONTENTS**

## REMEDIAL SYSTEM OPTIMIZATION FOR ATLANTIC BROOKLYN PROJECT

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