NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Remedial Bureau C 625 Broadway, 12th Floor, Albany, NY 12233-7014 P: (518) 402-9662 I F: (518) 402-9679 www.dec.ny.gov

Sent via email

October 13, 2021

Saber-North White Plains, LLC Martin Berger 80 Business Park Drive, Suite 100 Armonk, NY 10504 berger@saberfund.com

Re: Remedial Investigation Work Plan submitted in October 2021 White Plains Chrysler Car Dealership, Site No: C360209 City of White Plains, Westchester County

Dear Martin Berger,

The New York State Department of Environmental Conservation (the Department) in consultation with the New York State Department of Health (NYSDOH) has completed its review of the revised Remedial Investigation Work Plan (RIWP) submitted in October 2021 prepared by SESI, Inc. on behalf of Saber-North White Plains, LLC (Volunteer) for the above-referenced site. The above RIWP is hereby approved.

Please place the approved RIWP in the document repository established for the site. Please provide at least seven (7) days advance notice to the Department prior to performing any field work in connection with the approved RIWP. If you have any questions or concerns, please feel free to contact me at (518) 402-9662 or email at parag.amin@dec.ny.gov.

Sincerely,

Parag Amin P.E. Project Manager

Division of Environmental Remediation

Remedial Bureau C

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Geotechnical Environmental Site Civil

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October 12, 2021 via email: parag.amin@dec.ny.gov

RE: White Plains Chrysler Car Dealership Site Number C360209

70 Westchester Avenue
City of White Plains, Westchester, New York

Dear Mr. Amin:

Below please find the resolutions to the comments from the September 30, 2021 New York State Department of Environmental Conservation letter regarding the Draft Remedial Investigation Work Plan for the White Plains Chrysler Car Dealership.

Modification 1: Please update the date of the report on the front page as well as in the header and other places it appears in the RIWP from June to the month and year the revised RIWP is to be submitted.

SESI updated the RIWP with the October 2021 revised submittal date.

Modification 2, Section 3.2 Groundwater Remedial Investigation: Based the additional information provided in the revised RIWP, the pervious investigations did not investigate groundwater downgradient of the former underground storage tanks (USTs) located along the Westchester Avenue in the front portion of the site. The Department requires that the additional groundwater monitoring well downgradient of those USTs in the south east portion of the site be installed and sampled to fully characterize the groundwater contamination.

Please accordingly revise other pertinent sections of the work plan.

SESI has revised the pertinent sections of the work plan to include one additional monitoring well (RI-MW6) downgradient of the former USTs in the south east portion of the site.

Modification 3, Section 9.0, Remedial Investigation report, 2nd paragraph, item #4: Please indicate that the Remedial Investigation Report will identify post remediation (e.g. UST, pit, oil/water separator and lift removals etc.), sampling data collected as part of the previous investigations and will be considered in determining the nature and extent of the contamination.

SESI has indicated that the Remedial Investigation Report will identify post remediation sampling data collected as part of previous investigations.

Modification 4, Figure 3.2, Proposed Groundwater Sample Locations Plan: Please revise the figure to show the location of the additional groundwater monitoring well.

SESI has revised Figure 4.3 to shown on additional monitoring well RI-MW6.

Sincerely,

SESI CONSULTING ENGINEERS

Steve Gustems, PG Project Manager



Remedial Investigation Workplan

For:

White Plains Chrysler Car Dealership 70 Westchester Avenue White Plains, New York NYSDEC BCP Site # C360209

Prepared for:

Saber-North White Plains, LLC c/o Saber Real Estate Advisors 80 Business Park Drive Armonk, New York 10504

Prepared by: SESI CONSULTING ENGINEERS, D.P.C. 12A Maple Avenue Pine Brook, NJ 07058

> JUNE 2021 REVISED OCTOBER 2021

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APPENDIX G: CITIZEN PARTICIPATION PLAN (CPP)

CERTIFICATIONS

I, Fuad Dahan, certify that I am a professional engineer, and meet the definition of qualified environmental professional as defined in 6 NYCRR Part 375 and that this Remedial Investigation Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

Fuad Dahan 10/12/2021

NJ Professional Engineer # Date Signature

090531

It is a violation of Article 130 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 130, New York State Education Law.

1.0 INTRODUCTION

The New York State Department of Environmental Conservation (NYSDEC) has entered into a Brownfield Cleanup Program (BCP) with Saber-North White Plains, LLC, a Volunteer, for the property known as White Plains Chrysler Car Dealership Site (BCP# C360209) ("Site"). The Brownfield Cleanup Agreement (BCA) was executed on May 18, 2021. The property is located at 70 Westchester Avenue, White Plains, Westchester County, New York (referred to herein as "Site"). A Site Location Map is presented as **Figure 1.1**

This document comprises a Remedial Investigation Work Plan (RIWP) that describes the investigation activities to be conducted at the Site, as part of the Site's planned remedial investigation and remediation. This RIWP includes a description of the Site, summary of the Site history and previous environmental investigations, a description of the Site's physical, geologic, hydrogeologic setting and subsurface features and a plan of action for further investigation of the areas of concern identified previously.

This RIWP has been prepared to achieve the following objectives:

- To complete the horizontal and vertical delineation of the nature and extent of contamination on the Site;
- To identify any potential source areas of contamination:
- To determine the remedial action needed to protect human health and the environment;
 and
- To collect sufficient data to advance a Track 1 remediation of the Site.

This RIWP is developed in general accordance with the Department's Remediation Technical Guidance for Site Investigation and Remediation (DER-10).

2.0 PROJECT BACKGROUND

2.1 SITE DESCRIPTION

The Site consists of a 1.826-acre area parcel and is located at 70 Westchester Avenue, Westchester County, White Plains, New York. The Site is identified as 126.61-3-15.1 on the Westchester County tax map. The Site is bound by Franklin Avenue and retail businesses to the north, the White Coach Diner to the west, Westchester Avenue and the Westchester Mall to the south, and a closed car dealership to the east. A Site Plan is presented as **Figure 2.1**.

The Site previously consisted of six (6) contiguous lots that were merged on October 28, 2020. The Site is currently improved with an automotive sales and service dealer, associated building and asphalt paved parking spaces. The eastern portion of the building, which was constructed in 1925, consists of a single-story and two-story structure with small partial basement under the southeastern corner of the building. The western portion of the building, constructed in 1990, consists of a single-story structure with a half basement. Historically, the Site was improved with residential dwellings, an automotive garage, and a machine shop, and auto sales and service facilities. The Site is still temporarily being used as a car dealership and auto repair facility.

2.2 PROPOSED DEVELOPMENT

The planned redevelopment of the Site consists of a new 368,000-square-foot mixed-use multi-family/retail project with structured parking in White Plains, New York. The Project includes 226,000 gross square feet of residential units, 17,000 gross square feet of retail and 125,000 gross square feet of structured parking. The 212 residential units shall be a mixture of studio, one-bedroom, one-bedroom dens, and two-bedroom units configured in three separate buildings. One level of underground parking will be constructed below the new buildings to be constructed on the Site with a footprint encompassing nearly the entire site.

2.3 SITE HISTORY

The Site has been a confirmed active car dealership with auto repair, for at least the past 53 years, since at least 1967. However, the on-site commercial building has been present since

1925, suggesting that this was an auto dealership dating back to potentially 1925. Historic car dealership owners appear to date back to the 1940s.

2.4 PREVIOUS ENVIRONMENTAL INVESTIGATION

The following environmental reports were submitted with the BCA application and are summarized below:

- Tank Cleaning and Contaminated Soil Removal and Disposal Project, prepared by O'Brien
 & Gere, February 1990 (NOT FOUND but summarized in October 2000 Phase I)
- Remedial Action Report, prepared by S&S Environmental Sciences, Inc., for Westchester Chrysler-Plymouth/Jeep-Eagle, November 1994
- Phase I Environmental Site Assessment and Limited Phase II Site Investigation, 70
 Westchester Avenue, prepared by Earth Tech, October 2000
- Phase II Environmental Site Assessment Report 70-96 Westchester Avenue, prepared by Woodard & Curran, March 2015
- Phase II Environmental Site Assessment Addendum, 70 Westchester Avenue, prepared by Woodard and Curran, July 2015
- Phase II Environmental Site Assessment Report, Proposed Development, 70 Westchester Avenue, White Plains, New York, prepared by SESI Consulting Engineers (SESI), October 2020.
- Supplemental Environmental Site Assessment, Proposed Development, 70 Westchester Ave., White Plains, New York, prepared by SESI, March 2021.

2.4.1 TANK CLEANING AND CONTAMINATED SOIL REMOVAL AND DISPOSAL PROJECT (O'BRIEN &GERE)

The earliest report prepared for the Site was prepared by O'Brien and & Gere in 1990. While this report could not be located, it was described in the October 2000 Earth Tech Phase I as summarized below. The 1990 report allegedly described the excavation and removal of 11 underground storage tanks (USTs) at three (3) areas on the Site under the supervision of the NYSDEC and White Plains Fire Marshall. Excavation of the tanks and some soil occurred, and a total of 14 sidewall and bottom samples were taken from three (3) excavations. The soil sampling appeared to be limited to only six (6) volatile organic compounds (VOCs), which were

allegedly non detect, but toluene, ethylbenzene and xylenes were found in groundwater in excess of the State standards. An additional groundwater investigation was recommended.

2.4.2 REMEDIAL ACTION REPORT (S&S ENVIRONMENTAL SCIENCES)

In 1994, S&S Environmental Sciences conducted soil sampling and reporting related to the remediation of two floor pits associated with wash bays in the service garage. Remediation consisted of removal of waste oil, solvents and petroleum-contaminated soil from each pit. Allegedly the remediation of one was "successful," but excavation of in a second pit was halted at 7.5 feet even though contaminated soils were still present, and spill # 9407257 was reported.

2.4.3 PHASE 1 ENVIRONMENTAL SITE ASSESSMENT AND LIMITED PHASE II SITE INVESTIGATION (EARTH TECH)

Earth Tech conducted a Phase I ESA and Limited Phase II Site Investigation in October 2000. Earth Tech identified several Recognized Environmental Conditions (RECs), including underground hydraulic hoists, an oil/water separator, aboveground and underground storage tanks, and floor drains. These historical RECs are depicted on **Figure 2.2**. Earth Tech advanced eleven (11) soil borings and four temporary groundwater sampling points in the vicinity of several of the RECs. Acetone was detected in soil sample SB-01 at a concentration of 360 ug/kg, which reportedly exceeded the Technical Administrative Guidance Memorandum (TAGM) #4046 soil cleanup objective (SCOs) of 200 ug/kg. Ethylbenzene and xylenes were detected in soil sample SB-07 (collected near a historical gasoline UST) at concentrations of 19,000 ug/kg and 68,000 ug/kg, which exceeded the TAGM #4046 SCO of 5500 ug/kg and 1,200 ug/kg. TPH was detected at concentrations ranging from 67 mg/kg (SB-06) to 2,540 mg/kg (SB-02). Consequently, Earth Tech reported the detection of soil and ground water contamination to the NYSDEC and Westchester County Department of Health (WCDOH) on October 12, 2000. NYSDEC assigned Spill No. 0008186 to the Site. NYSDEC Spill No. 0008186 was closed in 2001.

2.4.4 PHASE II ENVIRONMENTAL SITE ASSESSMENT REPORT (WOODWARD & CURRAN)

Woodard & Curran conducted a Phase II Environmental Site Investigation in March 2015. A total of twenty-nine (29) soil samples were collected from twenty-three (23) soil borings on former

parcels 126.61-3-15 (70 Westchester Ave.), 126.61-3-16.1 (64-68 Westchester Ave.), 16.61-3-16.2 (62 Westchester Ave.), 126.61-3-23 (30-36 Franklin Ave.), 126.61-3-24 (38-40 Franklin Ave.). In addition, three (3) groundwater samples were collected from 2 permanent and one temporary monitoring wells. Results of soil sampling identified semi-VOCs (SVOCs) and metals impacts on the western paved parking area (SB-7 and SB-16) at concentrations exceeding the Restricted Residential Soil Cleanup Objectives (RRSCOs). Results of groundwater sampling identified the VOC toluene in temporary well TWP-CD-05 at a concentration of 11 ug/L, exceeding its NYSDEC Technical and Operations Guidance Series 1.1.1 (TOGS) GA Ambient Water Quality Standard (AWQS) of 5 ug/L. In addition, several SVOCs including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and chrysene were detected in well MW-B-7 at concentrations exceeding the AWQS.

2.4.5 PHASE II ENVIRONMENTAL SITE ASSESSMENT REPORT (WOODWARD & CURRAN)

Woodard & Curran conducted supplemental soil and groundwater samplings in July 2015. A total of six (6) soil samples and six (6) groundwater samples were collected from six (6) soil borings. Results of soil sampling detected VOCs including ethyl benzene, total xylenes, and 1,24-trimethylbenzene northeast of the building area (CD-19) at concentrations exceeding the RRSCOs. In addition, metals exceeding the Unrestricted Use Soil Cleanup Objectives (USCOs) were detected in CD-17 west of the building at concentrations exceeding the USCOs. Results of groundwater sampling identified the petroleum VOC toluene in temporary well TWP-CD-17 and TWP-CD-19, and several SVOCs in TWP-CD-17 at a concentrations exceeding the AWQS. In addition, numerous metals were detected in each groundwater sample collected at concentrations exceeding the AWQS.

2.4.6 PHASE II ENVIRONMENTAL SITE ASSESSMENT REPORT (SESI)

SESI conducted soil, soil vapor, and groundwater sampling in September 2020. Prior to subsurface investigations a geophysical survey was conducted to clear boring locations of utility and identify any subsurface anomalies in the vicinity of the borings. A total of twenty-six (26) soil samples was collected from twelve (12) soil borings, twelve (12) soil vapor samples were collected from twelve (12) temporary vapor points, and six (6) groundwater samples were collected from

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six (6) temporary monitoring wells. Soil and groundwater samples were analyzed for Target Compound List +30/Target Analyte List (TCL+30/TAL) including VOCs by EPA Method 8260C, SVOCs by EPA Method 8270D, Target Analyte List (TAL) Metals by EPA Method 6010C/7471, Polychlorinated Biphenyls (PCBs) by EPA Method 8082A, pesticides by EPA Method 8081B, and Cyanide by EPA Method 9082. In addition, soil and groundwater samples were analyzed for Perand Polyfluoroalkyl Substances (PFAS) by Modified EPA Method 537, and 1-4 dioxane by EPA Method 8270D. Soil vapor samples were analyzed for VOCs in accordance with EPA Method TO-15.

Results of the geophysical survey did not identify any anomalies indicative of USTs. The GPR report was not previously submitted with SESI's Phase II, and therefore is included as **Appendix A**. Analytical results of the Phase II ESA investigation and the historical investigations conducted by Woodard and Curran have identified SVOC and metals impacts to soil exceeding the applicable RRSCOs across the Site at depths to 11.5 feet below ground surface (ft-bgs). These exceedances may be correlated to the historic car maintenance uses on the Site. The metal exceedances in the soil are a result of the machine shop historic use.

Perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) were detected in soil in numerous borings across the Site at depths up to 9 ft-bgs. However, only PFOS was detected in one boring (S-2 0.894 ug/kg) in the northern parking lot at a concentration exceeded its NYSDEC USCO Soil Screening Level of 0.88 ug/kg in one soil sample. PFOS/PFOA were also detected in groundwater across the Site at concentrations exceeding the NYSDEC Groundwater Screening Levels. PFOS/PFOA were used as coating material and in several lubricants.

SVOC and metals impact to groundwater at concentrations exceeding the AWQS were identified in five (5) temporary monitoring wells sampled across the Site. The PCB aroclor 1242 was detected in one groundwater sample collected near the southwestern corner of the Site. The metals and SVOCs detected in groundwater are related to the detected soil exceedances and historic Site uses.

Carbon tetrachloride, trichloroethene (TCE), and tetrachloroethene (PCE) were detected in soil vapor. Specifically, carbon tetrachloride was detected as high as 17.6 ug/m³, PCE as high as 834 ug/m³ and TCE as high as 8.55 ug/m³. Carbon tetrachloride, TCE and PCE were not detected in

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any of the ambient/indoor air samples collected. These compounds were historically used as degreasers in auto repairs and maintenance.

2.4.7 SUPPLEMENTAL ENVIRONMENTAL SITE ASSESSMENT (SESI)

SESI conducted supplemental soil sampling in March 2021. A total of thirty-four (34) soil samples was collected from nine (9) soil borings and seven (7) test pits. Soil samples were analyzed for TCL+30/TAL, PFAS and 1-4 dioxane. Analytical results of the supplemental soil sampling identified SVOCs and metals impacts to soil in the western parking lot at depths to 8 ft-bgs exceeding the RRSCOs. Metals impacts were identified in the northern parking lots at depths of 2 to 7.5 ft-bgs exceeding the RRSCOs.

2.5 GEOLOGIC SETTING

According to the U.S. Geological Survey – White Plains, NY Quadrangle map, the Site is approximately 150 feet above the North American Datum. Based on the subsurface investigations conducted by SESI and Woodard & Curran, the stratigraphy of the Site, from the surface down, consists of 5 to 13 feet of fill, underlain by brown coarse sand with trace silt and gravel to 20 ft-bgs. Woodard and Curran reported bedrock at depths ranging from 16 to 41 ft-bgs.

2.6 HYDROGEOLOGIC SETTING

During the Phase II ESA in September 2020, groundwater was encountered at depths ranging from 10 to 19 feet below grade. Using well data collected in May 2014, Woodard and Curran determined the groundwater is flowing from west to east across the Site.

2.7 SUMMARY OF ENVIRONMENTAL ASSESSMENT

Based on the investigations conducted to date, the primary contaminants of concern (COCs) are anticipated to be VOCs, SVOCs, metals, pesticides, and PFAS. COCs will be refined based on the Remedial Investigation (RI) results.

Soil (maximum concentrations):

VOCs: Acetone (0.067 mg/kg)' Ethylbenzene (66 mg/kg), Xylenes (220 mg/kg).

- SVOCs: Benzo(a)anthracene (6.8 mg/kg), Benzo(a)pyrene (6.8 mg/kg),
 Benzo(b)fluoranthene (8.1 mg/kg), Benzo(k)fluoranthene (3.5 mg/kg), Chrysene (6.1 mg/kg), Dibenzo(a,h)anthracene (0.72 mg/kg), Indeno(1,2,3-cd)pyrene (5 mg/kg).
- Pesticides: Delta-BHC (0.0422 mg/kg), Alpha-BHC (0.121 mg/kg), 4,4'-DDE (0.018 mg/kg), 4,4'-DDD (0.0101 mg/kg), 4,4'-DDT (0.0177 mg/kg).
- Metals: Barium (634 mg/kg), Copper (970 mg/kg), Chromium (58.6 mg/kg), Lead (617 mg/kg), Mercury (0.317 mg/kg), Nickel (33.3 mg/kg), Zinc (840 mg/kg).
- **PFAS:** PFOS 0.894 ug/kg).

Groundwater (maximum concentrations):

- VOCs: Acetone (57 ug/L).
- **SVOCs**: Benzo(a)anthracene (72 ug/L); Benzo(a)pyrene (80 ug/L); Benzo(b)fluoranthene (94 ug/L); Benzo(k)fluoranthene (32 ug/L); Chrysene (60 ug/L), Fluoranthene (140 ug/L), Indeno(1,2,3-cd)pyrene (66 ug/L), Phenanthrene (59 ug/L), Pentachlorophenol (2.3 ug/L), Pyrene (110 ug/L).
- Metals: Antimony (3.58 ug/L), Arsenic (39.39), Barium (5299 ug/L), Beryllium (9.82 ug/L), Cadmium (9.93 ug/L), Chromium (1022 ug/L), Copper (920 ug/L), Iron (411000 ug/L), Lead (2230 ug/L), Magnesium (529000 ug/L), Manganese (34120 ug/L), Mercury (1.79 ug/L), Nickel (506.4 ug/L), Selenium (34 ug/L), Sodium (650000 ug/L), Thallium (3.55 ug/L), Zinc (2341 ug/L).
- **PCBs**: Aroclor 1242 (0.142 ug/L).
- **PFAS**: PFOA (61.7 ng/L), PFOS (213 ng/L)

Soil Vapor:

• Carbon tetrachloride (17.6 ug/m3), TCE (8.55 ug/m3), PCE (834 ug/m3).

3.0 FIELD REMEDIAL INVESTIGATION

Soil borings, soil vapor borings, and groundwater monitoring wells are proposed below based on the following rationale to complete the nature and extent delineation of contaminated soil, groundwater, and soil vapor on the Site. The applicable standards criteria and guidance (SCGs) for the Site soil are the USCOs for the planned Track.1 cleanup The applicable criteria for subslab vapor are the NYSDOH Decision Matrices (May 2017). The applicable standards criteria and guidance (SCGs) for the Site groundwater are the TOGS GA AWQS and the screening levels for PFOA and PFOS (NYSDEC Guidelines for Sampling and Analysis of PFAS, January 2021).

3.1 SOIL REMEDIAL INVESTIGATION

In order to further evaluate the soils, ten (10) soil borings will be performed on the Site to further evaluate and delineate soil contamination. In addition, waste characterization samples will be collected from the borings for disposal approval. The proposed soil boring locations are shown on **Figure 3.1**.

The borings will be advanced to a depth of 20 ft-bgs using direct-push or other drilling methods as needed. Soil samples will be at a minimum of one sample per 5-foot depth interval based on field screening that includes visual observations, photoionization detector (PID) readings and olfactory observations. Boring logs documenting soil classifications, PID readings, and visual observations will be provided in the final report.

Upon retrieval of the sampling barrel, the collected sample shall be placed in glass jars and labeled, stored on site (on ice in a cooler if necessary), and transmitted to the NYSDOH ELAP-certified testing laboratory. Chain-of-custody procedures will be practiced following Section 15, EPA-600/4-82-029, Handbook for Sampling and Sample Preservation of Water and Waste Waters. Soil samples for VOC analysis will be collected in Encore ® vials.

A geologist or engineer will be on site during the drilling operations to fully describe each soil sample, following the New York State Soil Description Procedure, and to retain representative portions of each sample.

The drilling contractor will be responsible for obtaining accurate and representative samples, informing the geologist of changes in drilling pressure, keeping a separate general log of soils encountered including blow counts [i.e., the number of blows from a soil sampling drive weight (140 pounds)] required to drive the split-spoon sampler in 6-inch increments, and installing monitoring wells to levels directed by the supervising geologist following specifications further outlined in this protocol.

Soil samples collected from the ten (10) boring locations will be analyzed by a NYSDOH Environmental Laboratory Accreditation Program (ELAP) certified laboratory for TCL + 30/TAL including VOCs by EPA Method 8260C, SVOCs by EPA Method 8270D, pesticides by EPA Method 8081B, PCBs by EPA Method 8082A, TAL metals by EPA Methods 6010C, 7471B, and 9012, the 21 PFASs compounds by EPA Modified Method 537, and 1-4,dioxane by EPA Method 8270. Category B deliverables will be requested on each sample chain of custody. SESI's field sampling procedures are described in the Quality Assurance Project Plan (QAPP) presented in **Appendix B.** The Sampling Plan for Emerging Contaminants is included as **Appendix C.**

Quality Assurance/Quality Control (QA/QC) samples will be collected and analyzed as specified in the QAPP. The number of duplicate, spiked, and blank samples analyzed will be collected at a frequency of 1 duplicate for every 20 samples. The inclusion and frequency of analysis of field blanks will be on the order of one per every 20 soil samples but not more than one per day. Samples to be analyzed for volatile organic compounds will be accompanied by a field blank for all matrix types and trip blank for water matrices. The proposed soil sample locations and the rationale for their locations are presented in **Table 3.1** below.

Table 3.1–Proposed Soil Sample Locations

Sample Name	Depth	Location	Rationale	Analysis	
	0-2-inch				
	4.5-5.0' (fill)		horizontal delineation along the northern		
RI-SB1	5-10' (PID Biased)	North Portion of Site	Site boundary (S-15).	TCL+30/TAL, PFAS, 1,4-Dioxane	
	10-15' (PID Biased)		Site boundary (3-15).		
	15-20' (above water table)				
	0-2-inch	Eastern boundary of Site			
	4.5-5.0' (fill)		horizontal delineation along the		
RI-SB2	5-10' (PID Biased)		northeastern Site boundary (S-8).	TCL+30/TAL, PFAS, 1,4-Dioxane	
	10-15' (PID Biased)		northeastern site boundary (3-0).		
	15-20' (above water table)				
	0-2-inch	Northeastern portion of Site			
	4.5-5.0' (fill)		horizontal delineation along the		
RI-SB3	5-10' (PID Biased)		northeastern Site boundary (S-16, S-17).	TCL+30/TAL, PFAS, 1,4-Dioxane	
	10-15' (PID Biased)				
	15-20' (above water table)				
	0-2-inch			TCL+30/TAL, PFAS, 1.4-Dioxane	
RI-SB4	4.5-5.0' (fill)	Northeastern portion of Site	horizontal delineation along the		
NF3D4	10-15' (PID Biased)	North castern portion of oile	northeastern Site boundary (S-5).	TOL: OUT TAL, TTAO, 1,4-DIOXAITE	
	15-20' (above water table)				

Sample Name	Depth	Location	Rationale	Analysis	
	0-2-inch			TCL+30/TAL, PFAS, 1,4-Dioxane	
RI-SB5	4.5-5.0' (fill)	Northwestern portion of Site	horizontal delineation along the		
020	10-15' (PID Biased)	Theram determ person or one	northw estern portion of Site (S-18, S-28).	1.02.00, 1.12, 11.110, 1,1.2.0.1.10	
	15-20' (above w ater table)				
	0-2-inch				
RI-SB6	4.5-5.0' (fill)	Western Portion of Site	horizontal delineation along w estern	TCL+30/TAL, PFAS, 1,4-Dioxane	
	10-15' (PID Biased) 15-20' (above w ater table)		boundary (S-19)		
	0-2-inch				
	4.5-5.0' (fill)		horizontal delineation along central portion		
RI-SB7	10-15' (PID Biased)	Central portion of Site	of Site (S-20)	TCL+30/TAL, PFAS, 1,4-Dioxane	
	15-20' (above w ater table)		01 GRO (0 20)		
	0-2-inch			TCL+30/TAL, PFAS, 1,4-Dioxane	
RI-SB8	4.5-5.0' (fill)	Cauthuu aatama mantian af Cita	horizontal delineation along the southw estern portion of Site (S-13).		
KF3D0	10-15' (PID Biased)	Southw estern portion of Site		TOL+30/TAL, PFAS, 1,4-Dioxane	
	15-20' (above water table)				
	0-2-inch				
RLSB9	4.5-5.0' (fill)	Southern parties of Site	horizontal delineation along the southw estern portion of Site.	TCL+30/TAL, PFAS, 1,4-Dioxane	
NFODS	10-15' (PID Biased)	Southern portion of Site		TOL+30/TAL, FFA3, 1,4-Dioxane	
	15-20' (above w ater table)				
	0-2-inch				
RI-SB10	4.5-5.0' (fill)	Southeastern portion of Site	horizontal delineation along the	TCL+30/TAL, PFAS, 1,4-Dioxane	
IN-SDIO	10-15' (PID Biased)	Southeastern portion of Site	southeastern portion of Site.	TOL TOUTAL, TTAG, 1,4-DIOXAITE	
	15-20' (above w ater table)				

3.2 GROUNDWATER REMEDIAL INVESTIGATION

To investigate the Site groundwater, a total of six (6) permanent groundwater monitoring wells will be installed as shown on **Figure 3.2**. The wells will be installed to a depth of 10 feet below the groundwater table, or refusal on bedrock, whichever occurs first. Each monitoring well will be constructed with 2-inch diameter well screens. The well screening will intersect the water table and extend to the bottom of the well boring. The annular space of each well will be filled with well sand to at least 2 feet above the screening and will be sealed with hydrated bentonite or cement grout. Finally, each monitoring well will be completed with a flush-mount road-box or stickup as necessary. A typical boring and well construction log is provided in **Appendix D**.

The Groundwater RI is conducted to achieve the following:

- delineate the nature and extent of Area of Concern (AOC)-specific contaminants in the Site groundwater;
- identify actual or potential impacts to sensitive receptors, e.g. surface water;
- determine whether a contaminant plume exists;

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- gather sufficient data to determine groundwater flow direction and contour map and evaluate groundwater remedial alternatives, including, as appropriate, monitored natural attenuation (MNA), and
- provide information on the background quality of the groundwater flowing into the Site.

The wells will be surveyed for location and elevation. The survey data will be provided pursuant to the DER-10 requirements in an acceptable format (e.g., North America Datum 83 [NAD83]). The wells will be gauged for groundwater depth to determine the groundwater elevation. The Site-specific groundwater flow direction and gradient will be determined based on the latest elevation data and summarized in the Remedial Investigation Report (RIR). The proposed well locations are shown on **Figure 3.2**.

Two (2) rounds of sampling will be conducted from the newly installed wells (RI-MW-1, RI-MW2, RI-MW3, RI-MW4, RI-MW5, and RI-MW6) and existing well MW-B7 and MW-B15. The data will be analyzed to determine whether groundwater contamination exists, the magnitude and the extent of the potential contaminant plume. In addition to the analytical data, field measurements and chemical analyses will be conducted to characterize the impacted groundwater.

All the wells will be sampled for TCL + 30/TAL metals, PFAS, and 1-4 dioxane. The VOCs will be analyzed by EPA Method 8260C, SVOCs by EPA Method 8270D, pesticides by EPA Method 8081B, PCBs by EPA Method 8082A, TAL metals by EPA Methods 6010C, 7471B, and 9012, PFAS compounds by Modified EPA Modified Method 537, and 1-4,dioxane by EPA Method 8270 SIM. the QAPP which describes all field sampling procedures is included as **Appendix B**, and the Sampling Plan for Emerging Contaminants is included as **Appendix C**. The proposed groundwater monitoring wells and the rationale for their locations are presented in the **Table 3.2** below.

Table 3.2-Proposed Groundwater Monitoring Wells

Well ID	Location	Rationale	Total Depth	Screen length	Analysis
MW-B7	Southwestern Corner of Southern Parking Lot	Sample Existing Monitoring Well to Monitor Concentration Trends	20	10' (10-20')	TCL+30/TAL, PFAS, 1,4-Dioxane
MW-B15	Central Portion of Northern Parking Lot Sample Existing Monitoring Well to Monitor Concentration Trends		20	10' (10-20')	TCL+30/TAL, PFAS, 1,4-Dioxane
RI-MW1	Northwestern Corner of Southern Parking Lot	Delineate Upgradient Groundwater Quality	20	10' (10-20')	TCL+30/TAL, PFAS, 1,4-Dioxane
RI-MW2	Southeastern Portion of Northern Parking Lot	Delineate Groundwater Quality at Downgradient Boundary	20	10' (10-20')	TCL+30/TAL, PFAS, 1,4-Dioxane
RI-MW3	V3 Central Portion of Southern Parking Lot Delineate Groundwater Quality in South Parking Lot (CD-17)		20	10' (10-20')	TCL+30/TAL, PFAS, 1,4-Dioxane
RI-MW4	Central Portion of Eastern Building Delineate Downgradient Groundwater Quality (GW-4)		20	10' (10-20')	TCL+30/TAL, PFAS, 1,4-Dioxane
RI-MW5	Northwestern Portion of Western Parking Lot	Delineate Upgradient Groundwater Quality	20	10' (10-20')	TCL+30/TAL, PFAS, 1,4-Dioxane
RI-MW6	MW6 Southeastern Portion of Site Investigate Groundwater Quality Downgradient of Historical USTs		20	10' (10-20')	TCL+30/TAL, PFAS, 1,4-Dioxane

Groundwater samples will be analyzed by a NYSDOH ELAP certified laboratory, and Category B deliverables will be requested on each sample chain of custody. In addition, QA/QC samples will be collected and analyzed as specified in the QAPP. Specifically, the number of duplicate, spiked and blank samples analyzed will be a minimum of 1 duplicate for every 20 samples. For the aqueous matrix, field blanks will be collected at a frequency of one per day. Samples to be analyzed for volatile organic compounds will be accompanied by a trip blank for each shipment and field blanks water matrix.

The wells will be sampled using the low flow technique, when possible. A flow rate of 100 ml to 250 ml per minute is used to purge the wells. Drawdown should not exceed 0.3 feet. At the initiation of low flow purging water levels and field parameters are recorded. Field parameters are then monitored every five minutes during low flow purging using a flow through cell. When three consecutive measurements of pH differ by 0.1 units or less, with ORP within 10 mv or less, turbidity varies 10 percent or less, conductivity differs by 3 percent or less and dissolved oxygen by 10 percent or less, sampling may begin. Flow through cells allow continuous real-time readings. When the parameters stabilize, the flow through cell is disconnected and sample bottles

are filled directly from the tubing. If the parameters of a well do not stabilize in a timely manner, the groundwater sample will be collected after emptying three well volumes from the well being sampled. In addition to water samples collected from the monitoring wells, two types of "blanks" will be collected and submitted to the chemical laboratory for analyses. The blanks will consist of 40 ml VOA vials, as follows:

- A trip blank will be prepared before the sample bottles are sent by the laboratory. It consists of a sample of distilled, deionized water that accompanies the other sample bottles into the field and back to the laboratory. A trip blank will be included with each shipment of samples where sampling and analysis for TCL volatiles is planned (water matrix only). The trip blank will be analyzed for TCL VOCs as a measure of potential contamination from background sources and their effect on the results.
- In order to check for contaminant carryover when non-dedicated sampling equipment is used, a rinsate blank will be submitted to the laboratory. This blank will also be analyzed for TCL VOCs.

3.3 SOIL VAPOR INVESTIGATION

SESI will collect seven (7) sub-slab soil vapor samples from seven (7) soil vapor locations. In addition, collocated indoor/ambient air samples will be collected at each sub-slab vapor sample location. The proposed soil vapor point locations are shown on **Figure 3.3**. The purpose of the soil vapor investigation is to assess the potential for vapor intrusion into future buildings.

The soil gas samples will be collected in accordance with the procedures of the NYS Department of Health October 2006 Guidance for Evaluating Soil Vapor Intrusion in the State of New York. Specifically, the sub-slab soil vapor probes will be advanced using direct push sampling equipment and samples will be collected by installing vapor implants. The soil vapor depth will be based on the final construction and development plan. A sacrificial vapor point connected to flexible tubing will be inserted into the borehole. The annular space of the borehole will be filled with sand and the surface will be sealed with bentonite to seal the surface. Prior to sampling the tubing system will be purged of ambient air with a low-flow pump.

The indoor air and sub-slab soil vapor samples will be collected into laboratory supplied 2.7-liter, stainless-steel summa canisters. The summa canisters will be equipped with a manometer to

verify the canister is under vacuum, and a flow controller will be set to a flow rate of 200 ml/min. A sample log sheet will be maintained summarizing sample identification, date and time of sample collection, sampling depth, identity of samplers, sampling methods and devices, soil vapor purge volumes, volume of the soil vapor extracted, vacuum of canisters before and after the samples are collected, apparent moisture content of the sampling zone, and chain of custody protocols. The vapor samples will be sent to a certified laboratory for analysis of VOCs in accordance with EPA Method TO-15. In addition to the soil vapor, one ambient air sample will be collected with a 6-liter summa canister set to a flow rate of 200 ml/min. The field sampling procedures are described in the QAPP, which is included as **Appendix B**.

As part of the vapor sampling, a tracer gas will be used to serve as a QA/QC device to verify the integrity of the soil vapor probe seal. Helium will be used as the tracer gas, and a box will serve to keep it in contact with the probe during testing. A portable monitoring device will be used to analyze a sample of soil vapor for the tracer prior to sampling. If the tracer sample results show a significant presence of the tracer, the probe seals will be adjusted to prevent infiltration. At the conclusion of the sampling round, tracer monitoring will be performed a second time to confirm the integrity of the probe seals. SESI's field sampling procedures are described in the QAPP presented in **Appendix B.** In addition to the soil vapor, one ambient air sample will be collected with a 6-liter summa canister set to a flow rate of 100 ml/min. The proposed soil vapor sample points are presented in the **Table 3.3** below.

Table 3.3–Proposed Soil Vapor Sample Locations

Location Name	Location	Rationale	Proposed Sampling Depth (ft)	Sample Media	Sample Type	Analysis
RI-SV1	Central Portion of North Parking Lot	Investigate Central Portion of North Parking Lot	5	Soil Vapor/Ambient Air	(200 mL/min)	TO-15
RI-SV2	Northeastern Corner of Eastern Building	Delineate VOCs in SV-8	5	Soil Vapor/Ambient Air	(200 mL/min)	TO-15
RI-SV3	Central Portion of Eastern Building	Delineate VOCs in SV-8	5	Soil Vapor/Ambient Air	(200 mL/min)	TO-15
RI-SV4	Southeastern Portion of Western Building	Investigate Southeastern Portion of Western Building	5	Soil Vapor/Ambient Air	(200 mL/min)	TO-15
RI-SV5	Southern End of Western Building	Investigate Southern End of Western Building	5	Soil Vapor/Ambient Air	(200 mL/min)	TO-15

Location Name	Location	Rationale	Proposed Sampling Depth (ft)	Sample Media	Sample Type	Analysis
RI-SV6	Southwestern Portion of Site	Investigate Southwestern Portion of Site	5	Soil Vapor/Ambient Air	(200 mL/min)	TO-15
RI-SV7	Northwestern Corner of Western Building	Investigate Northern Portion of Western Building Parking Lot	5	Soil Vapor/Ambient Air	(200 mL/min)	TO-15

4.0 DECONTAMINATION AND IDW

Equipment utilized for ground intrusive activities (i.e. borings and wells) will be decontaminated between each boring. Equipment utilized for sample collection (i.e. spoons, trowels) will be decontaminated between each sample unless disposable equipment is utilized. Appropriate decontamination areas will be established to support work being conducted in each area of the Site. PFAS free certified deionized water, supplied from the laboratory, will be used for the decontamination of the sampling tools if needed. Locally supplied water, if available, or water supplied by the driller in a tank, will be used to decontaminate the equipment.

All investigative derived waste (IDW) of soil cuttings and purged groundwater will be containerized, sampled, and properly disposed of pursuant to DER-10 requirements. Disposable sampling equipment, including macro core liners, spoons, gloves, bags, paper towels, and PPE that contacts environmental media, will be double bagged and disposed of as municipal trash in a facility trash dumpster as non-hazardous refuse.

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5.0 SURVEY

After the RI sampling scope is completed, a survey will be completed, which includes the locations and elevations of all the monitoring wells, soil borings, and soil vapor points.

6.0 HUMAN HEALTH EXPOSURE ASSESSMENT

A qualitative human health exposure assessment will be performed for the Site in accordance with the New York State Department of Health's Qualitative Human Health Exposure Assessment guidance document. Sampling data, along with the physical conditions of the contaminant sources or physical hazards near the Site, will be reviewed. Potential on-site and off-site exposures will be evaluated. The Exposure Assessment will describe the nature and size of the population exposed, or potentially exposed, to the contaminants that are present at, or migrating from the Site, and will characterize the exposure setting, identify exposure pathways, and evaluate contaminant fate and transport.

Several objectives will be met by the exposure assessment. First, applicable Site information and characterization data for environmental media of concern will be evaluated. Applicable SCGs, including Part 375 SCOs and CP-51 SCOs for soil, and AWQS for groundwater and surface water, will be applied. Second, a qualitative assessment will be made if there is a potential for off-Site migration of any contaminants.

An assessment of current and future Site activities and Site use will be conducted in relation to potential human exposure. Next, potential exposure pathways will be identified, and each aspect of the potential exposure pathway will be evaluated. Soil and groundwater contamination will be addressed and the impact of remediation on future exposure scenarios will be analyzed.

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7.0 FISH AND WILDLIFE IMPACT ANALYSIS

A Fish and Wildlife Resources Impact Analysis (FWIA) Decision Key will be completed prior to the excavation work to determine if a FWIA is needed. Contaminant migration pathways and any fish and wildlife exposure pathways will be identified. As stated in the FWIA, "if no resources are associated with the site or if there is no potential for contaminant migration to the resources, then only the necessary information to support that conclusion should be provided."

If resources are identified, or migration pathways exist, a FWIA will be completed and submitted as part of the RI Report. The FWIA would include qualitative estimates of the following: 1) the routes, intensity, frequency, and duration of actual or potential exposures to chemicals; 2) the nature and size of the population exposed to the contaminants that are present at or migrating from the site; 3) the exposure setting and possible exposure pathways; and 4) contaminant fate and transport.

A Fish & Wildlife assessment is not anticipated for this Site due to its urban location and distance from surface water bodies and wildlife areas.

8.0 DUSR

Following the completion of the laboratory analysis program, a Data Usability Summary Report (DUSR) will be completed for the lab data and included as part of the RI Report. The DUSR will include available datasets from previous investigations, as well as data from this phase of Site characterization. The DUSR is carried out as specified in DER-10 to evaluate the quality control measures that were implemented during the field and laboratory analytical programs, with the objective of determining whether the reported analytical data are representative and usable for decision making. The DUSR will evaluate whether the data are technically defensible (i.e. were all analytical data requirements met and documented?). Data usability analysis reviews the Site data to determine whether they are adequate to draw conclusions regarding the nature and extent of contamination.

The items that will be reviewed as part of the DUSR will include the following:

- Completeness (number of samples collected and analyzed compared to plans)
- Chains of custody are complete and accurate
- Holding times
- Instrument calibration
- Relative percent difference between field duplicates
- Reasonableness of data (e.g. relationships between total and soluble analytes)
- Blank contamination

The DUSR will be conducted in accordance with guidelines provided under Appendix 2B of DER-10. The site-specific Quality Assurance Project Plan (QAPP) is included in **Appendix B**.

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9.0 REMEDIAL INVESTIGATION REPORT

Following the completion of the RI activities and the receipt of sample results, a RIR report will be prepared. The RIR report will summarize the activities completed during the RI including analytical results, well construction and sampling logs, waste characterization information for disposal purposes, conclusions from the FWIA if necessary, a DUSR and laboratory data packages. Scaled figures showing the sample locations and areas of contamination exceeding applicable standards will be prepared for soil, soil vapor, and groundwater. Sampling results will be summarized and discussed and the need for additional investigation and remediation will be evaluated (including the removal of hydraulic lifts, drains, subsurface pits, tanks, drains, etc. if applicable). In addition, analytical summary tables will be prepared for soil, soil vapor, and groundwater compared to applicable standards.

The RIR will also include: 1) a summary of the site history and previous investigations, 2) a description of current site conditions, 3) the identification of exposure pathways via a Qualitative Human Health Exposure Assessment; an analysis of the results, 4) a description of the nature and extent of the contamination including post remediation soil data collected during prior investigations (ie. UST, pit, oil/water separator, and lift removals); and 5) a detailed conclusions with recommendations.

Analytical data collected during the Remedial Investigation and previous data used for the selection of the remedy will be submitted in the NYSDEC approved Electronic Data Deliverable (EDD) format. EDDs will be prepared using the DEC's Environmental Information Management System (EIMS) database software application EQuISTM for submission.

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10.0 QUALITY ASSURANCE/QUALITY CONTROL

QA/QC is addressed in the QAPP included as **Appendix B**. The QAPP outlines procedures to be followed for sampling and analysis to ensure quality of the results. A DUSR will be prepared with the final reports to document the reliability of the sample results.

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11.0 HEALTH AND SAFETY PLAN

A Site-specific Health and Safety Plan (HASP) has been prepared and is included as **Appendix E**. All on-site personnel and visitors involved in the RI will be required to read and sign the HASP prior to entry of the Site.

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12.0 COMMUNITY AIR MONITORING

A Community Air Monitoring Plan (CAMP) is provided as **Appendix F**, in accordance with DER-10 requirements for remedial investigation. The CAMP sets forth air monitoring procedures that will be utilized to measure airborne emissions during the RI, in order to minimize the release of contaminants to off-Site areas.

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13.0 CITIZEN PARTICIPATION

Citizen participation activities will be performed throughout the RI process to involve and inform the public. The specific citizen participation activities to be performed are outlined in the Citizen Participation Plan (CPP), included as **Appendix G**.

14.0 REMEDIAL INVESTIGATION SCHEDULE

The proposed remedial investigation schedule is presented on **Table 14.1** below.

Table 14.1: Proposed Remedial Investigation Schedule

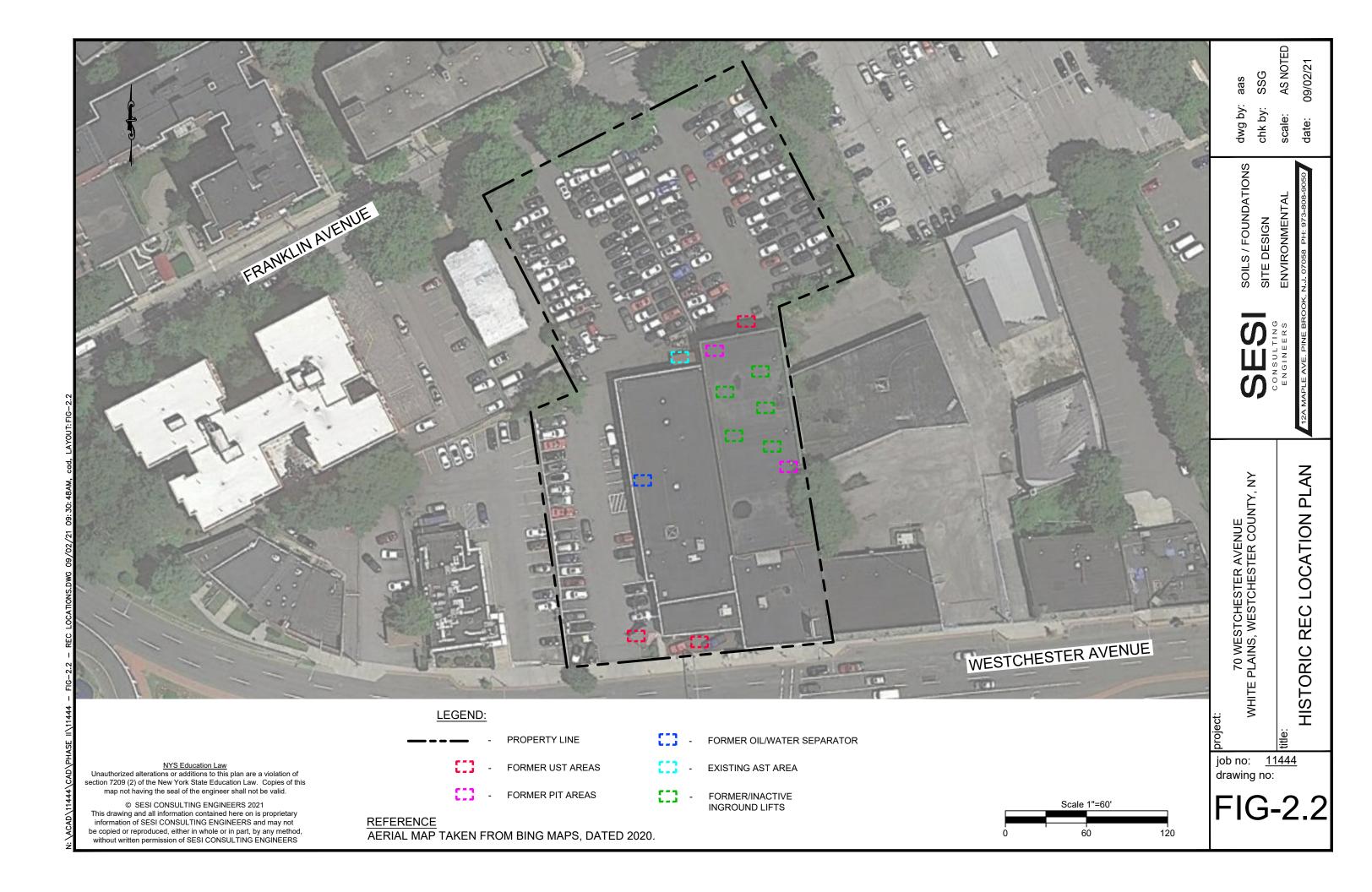
Activity	Scheduled Date	
Remedial Investigation – Soil and Soil Vapor Sampling	Commencing November 1, 2021 after 30 day public comment period (Anticipated timeframe 2 weeks)	
Pamadial Investigation Croundwater Sampling	Commencing November 1, 2021	
Remedial Investigation Groundwater Sampling	(Anticipated timeframe 1 week)	
Submit Draft RIR	December 1, 2021	

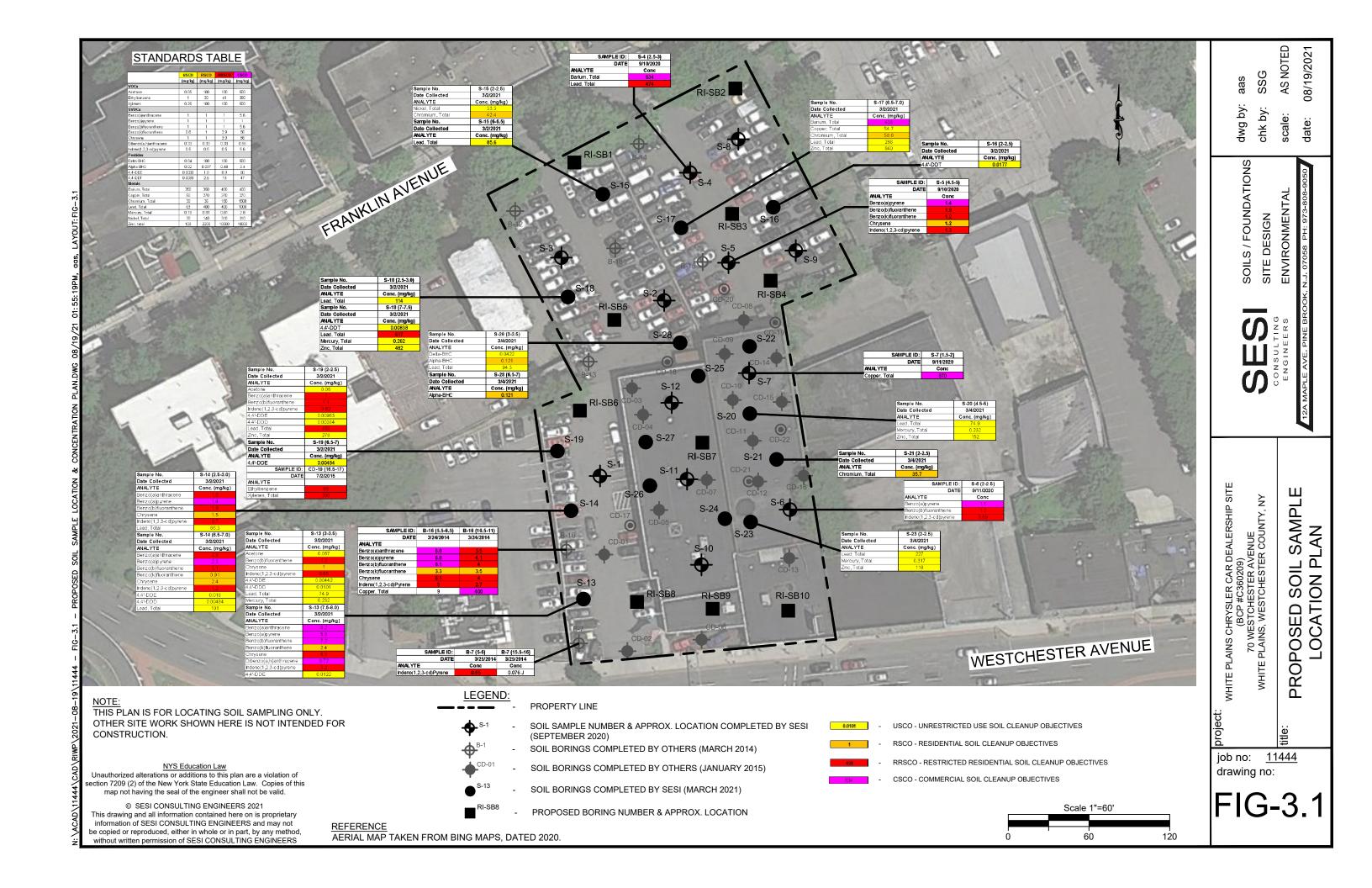


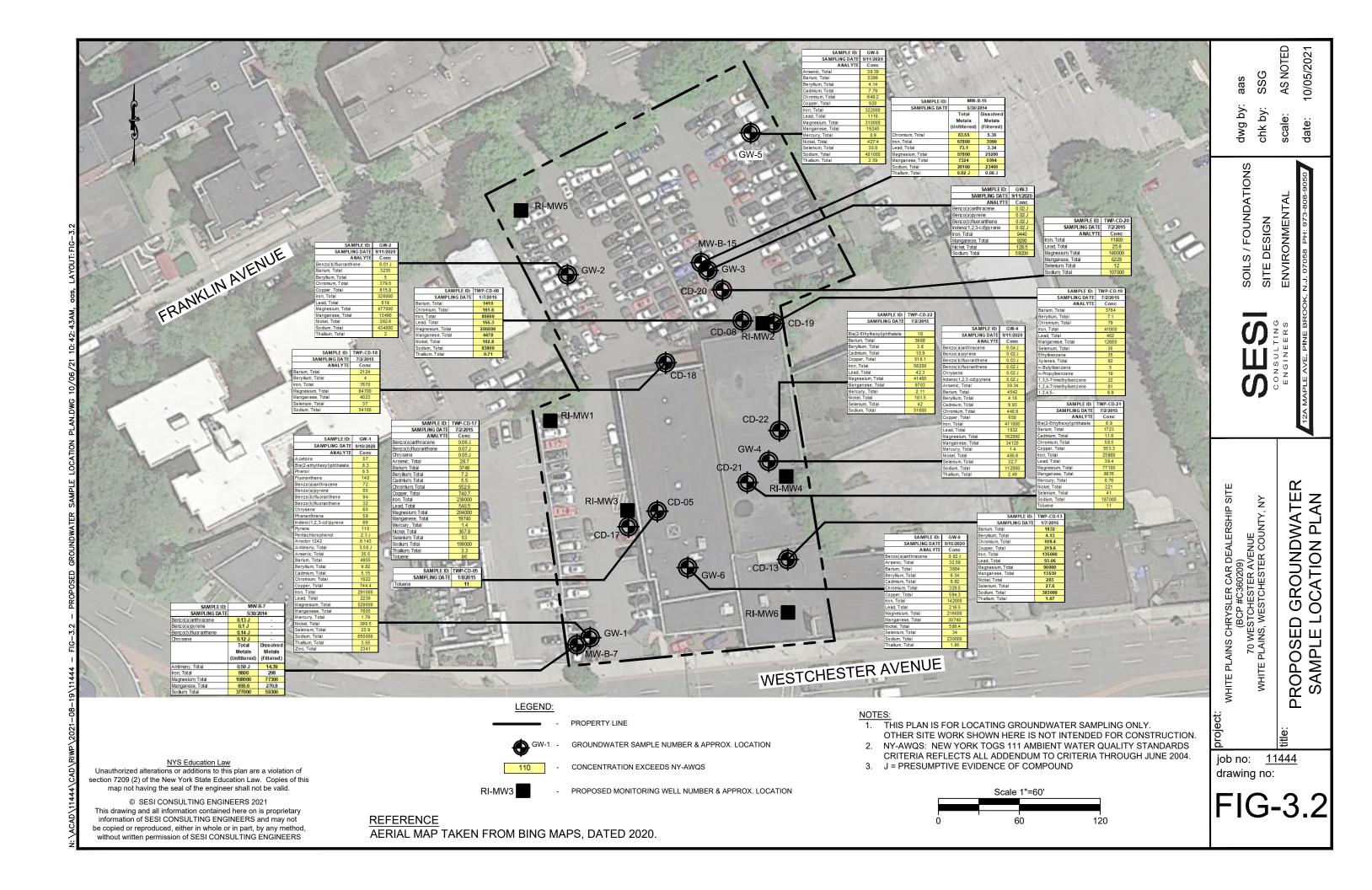


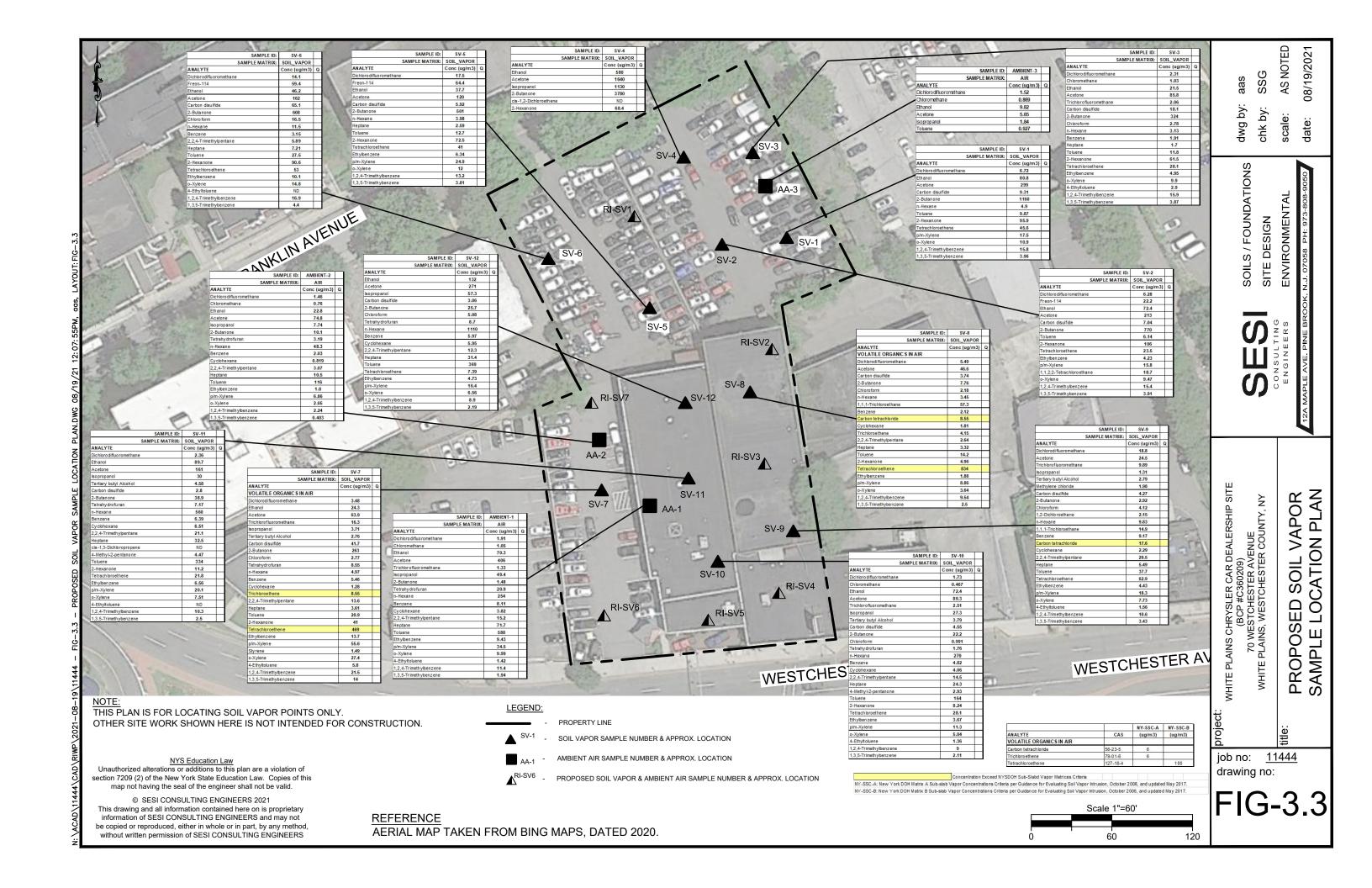
AERIAL MAP TAKEN FROM BING MAPS, DATED 2020.

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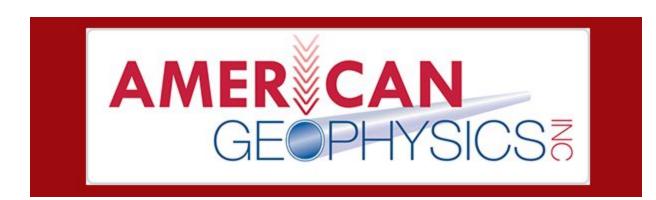








Appendix A: Phase II GPR Survey



Geophysical Investigation Report

Location:

70 Westchester Avenue White Plains, NY 10601 (AGInc. Job No. 1919566)

Prepared for:

SESI Consulting Engineers 12A Maple Avenue Pinebrook, NJ 07058

Investigated and prepared by:

Dan Jonasz

American Geophysics, Inc. 180 Main Street, #177 Butler, NJ 07405 833-SCAN GPR/ 833-722-6477

Completed on:

September 10, 2020

INTRODUCTION

American Geophysics, Inc. (AGInc.), is a geophysical survey and investigation services firm which provides Environmental & Engineering Geophysics (EEG) services to the environmental consulting, construction, and engineering communities. Led by over 20 years of field experience, AGInc. takes pride in providing the highest training for our technicians and the use of the most current and state-of-the-art equipment. This winning combination of experience and technology results in the most accurate findings.

METHODOLOGY

Geophysical surveys are typically accomplished by employing the following techniques; Ground-penetrating Radar (GPR), electromagnetic metal detector (Fisher TW6), radio frequency line locating (RF), Electromagnetic Profiler (EM). Underground storage tanks (USTs), utilities, and metallic anomalies are typically traced and mapped with RF, GPR, EM, and a magnetometer depending on the size, matrix and conductive properties of the targets. Site conditions and client specifications of the areas of concern (AOCs), determine the survey approach and equipment used to provide the most comprehensive data possible.

Equipment Used:

Radiodetection RD8000 PDL pipe and cable locator

Radiodetection RD1100 250MHz ground penetrating radar (GPR)

Fisher TW-6 Electromagnetic Magnetometer

SCOPE OF WORK

On September 10th, 2020, a geophysical survey and investigation was completed at the above mentioned location. The scope of work was to mark all detected utilities and subsurface anomalies at each individual drilling location. Approximately 14 drilling locations were scanned. Eight (8) locations were in the parking areas, and six (6) locations were inside of the service garages. Surface conditions consisted of asphalt and concrete.

SURVEY RESULTS

All the equipment was used in an octagonal-grid pattern over the AOCs. 3D data was collected and 2D locations were logged. The RD 8000 was also used in many different modes, directly and passively. Some shallow bedrock was detected in the parking areas. A few electrical conduits for the parking lot lighting were detected and marked with pink paint. The garage locations consisted of an area approximately 5 feet in diameter. Some drain lines were detected in the lowest section of the garage, and one drilling location was moved accordingly. The slab thickness at the lowest level was approximately 6 inches with wire mesh reinforcement. The upper section of the garage consisted of a slab on grade without reinforcement, and varied from approximately 3 inches to 6 inches in thickness. All findings were marked on site, and discussed with the client representative. Please see the figures section, below.

LIMITATIONS

The GPR signal penetration varied and was estimated as ~(2 ft-6ft) below ground surface (BGS). The interior locations provided signal penetration to approximately 2 ft. BGS. Due to surface conditions and the dielectric properties of the subsurface and properties of concrete, plastic polymer, and fiberglass, not all subsurface anomalies and utilities may have been detected.

Non conductive materials, buildings, concrete barriers, wet soils, saturated conditions, cracked surfaces, curb lines, metal structures and metal fencing may have affected survey results near and immediately beneath them.

Figures





Fig. 1: Image of exterior locations with findings marked in pink paint.

Fig. 2: Image of exterior locations with findings marked in pink paint.

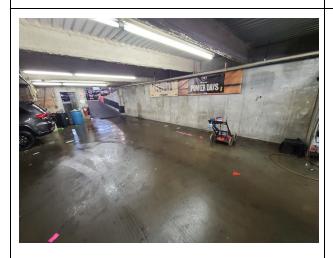


Fig. 3: Image of section that was near a drain line and the boring locations were moved closer to the wall.

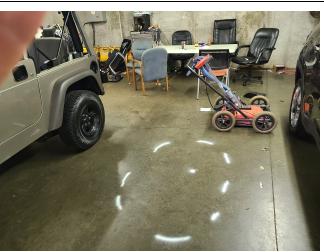


Fig. 4: Image of one of the areas of investigation, approximately measuring 5 ft in diameter.

WARRANTIES

- · American Geophysics, Inc. does not guarantee that utilities, conduit, and steel reinforcement will be avoided during drilling, cutting, trenching, and coring.
- · All utility designating will be in compliance with ASCE 38-02 (level B).
- · All field services were conducted in compliance with the industry standard of care guidelines found in CSDA-BP-007 and marked in appropriate colors as per the APWA (American Public Works Association).
- The GPR unit must have direct contact with the concrete in order to collect quality data.
- · Any areas covered with debris cannot be scanned correctly with GPR.
- · Wet floors will not allow proper marking with paint and/or permanent marker.
- · All concrete slabs must be monolithic pours.
- · Dairy brick and some types of tile may cause signal interference.
- · New concrete can adversely affect the signal penetration and should be given a minimum of one month curing time.
- · All areas should be clear for scanning and marking.

The field observations and measurements reported herein are considered sufficient in detail and scope for this project. American Geophysics, Inc. warrants that the findings and conclusions contained herein have been promulgated in accordance with generally accepted geophysical methods. There is a possibility that conditions may exist which could not be identified within the scope of this project and were not apparent during the site activities performed for this project.

American Geophysics, Inc. represents that the services were performed in a manner consistent with that level of care and skill ordinarily exercised by geophysical consultants under similar circumstances. No other representations to Client, express or implied, and no warranty or guarantee is included or intended in this agreement, or in any report, document, or otherwise.

American Geophysics, Inc. believes that the information provided in this report is reliable. However, American Geophysics, Inc. cannot warrant or guarantee that the information provided by others is complete or accurate. No other warranties or guarantees are implied or expressed.

GPR data is subject to signal anomalies and operator interpretation. The GPR data is intended to provide the locations of areas of concern requiring additional investigation or the approximate location of underground structures and utilities. Great care must be utilized when excavating, drilling, and cutting around subsurface structures and utilities, since GPR data can only be used for estimation purposes and GPR data, is subject to misinterpretation. American Geophysics, Inc. cannot guarantee that utilities, post-tension cables, and/or rebar will not be incurred during drilling, cutting, coring, and excavation activities.

Hand clearing or vacuum-excavation should be performed within 2.5' of any marks. American Geophysics, Inc. does not guarantee that utilities will not be encountered during drilling and/or excavation. Mark-out services performed by American Geophysics, Inc. do not satisfy state mark out requirements. By law, the appropriate state mark-out service must be notified prior to any digging activities (i.e. NJ one-call, PA one-call, CT call before you dig, MD & VA miss utility, dig safely NY, FL one-call, 811 one-call, call before you dig, Sunshine State One-Call).

This report was prepared pursuant to the contract American Geophysics, Inc. has with the Client. That contractual relationship included an exchange of information about the property that was unique and between American Geophysics, Inc. and its client and serves as the basis upon which this report was prepared. Because of the importance of the communication between American Geophysics, Inc. and its client, reliance or any use of this report by anyone other than the Client, for whom it was prepared, is prohibited and therefore not foreseeable to American Geophysics, Inc.

Reliance or use by any such third party without explicit authorization in the report does not make said third party a third-party beneficiary to American Geophysics, Inc. contract with the Client. Any such unauthorized reliance on or use of this report, including any of its information or conclusions, will be at the third party's risk. For the same reasons, no warranties or representations, expressed or implied in this report, are made to any such third party.

Appendix B: Quality Assurance Project Plan

White Plains Chrysler Car Dealership

WHITE PLAINS, NEW YORK BCP# C360209

Quality Assurance Project Plan (QAPP)

Prepared for:

Saber-North White Plains, LLC c/o Saber Real Estate Advisors 80 Business Park Drive Armonk, New York 10504

Prepared by: SESI CONSULTING ENGINEERS, D.P.C. 12A Maple Avenue Pine Brook, NJ 07058

JUNE 2021

1.0 PROJECT DESCRIPTION

This document presents the quality assurance project plan (QAPP) for the Remedial Investigation Workplan (RIWP) for the proposed development of the White Plains Chrysler Car Dealership (the Site). The Site consists of a 1.826-acre area parcel and is located at 70 Westchester Avenue, Westchester County, White Plains, New York. The Site is identified as 126.61-3-15.1 on the Westchester County tax map. The Site is bound by Franklin Avenue and retail businesses to the north, the White Coach Diner to the west, Westchester Avenue and the Westchester Mall to the south, and closed car dealership to the east.

The Site previously consisted of six (6) contiguous lots which have been merged on October 28, 2020. The Site is currently improved with an automotive sales and service dealer, associated building and asphalt paved parking spaces. The eastern portion of the building, which was constructed in 1925, consists of a single-story and two-story structure with small partial basement under the southeastern corner of the building. The western portion of the building which was constructed in 1990 consists of a single-story structure with a half basement. Historically, the Site was improved with residential dwellings, an automotive garage, and a machine shop, and auto sales and service facilities.

2.0 PROJECT ORGANIZATION

The RIWP will be conducted by Soils Engineering Services, Inc. (SESI), on behalf of Saber-North White Plains, LLC. The organization of SESI's key project management and field staff, and respective areas of responsibility, is presented below.

2.1 Project Principal

Fuad Dahan PhD, P.E.

Provide technical and administrative oversight and guidance throughout the project, assist in securing company resources, participate in technical review of deliverables, and attend key meetings as needed.

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2.2 Principal Engineer

Fuad Dahan, PhD, P.E.

Provide technical guidance and review of reports, analytical data. Will have key involvement in screening and development of remedial alternatives.

2.3 Project Manager

Steven Gustems

Responsible for maintaining the day-to-day schedule for completing the fieldwork and deliverables according to BCP program requirements and client expectations.

2.4 Remedial Investigation Program Manager

Ryan Warren

Responsible for coordinating and directing field efforts of SESI staff and subcontractors, and for maintaining that work is done according to QAPP specifications.

2.5 Field Team Leader

Ryan Warren

Responsible for overseeing field work during the RI, including observing subcontractors, maintaining field notes, and collecting samples of various environmental media, in accordance with the NYSDEC-approved Work Plan.

2.6 Quality Assurance Officer

Joseph Scardino

Responsible for reviewing sampling procedures and certify that the data was collected and analyzed using the appropriate procedures.

3.0 QA/QC OBJECTIVES FOR MEASUREMENT OF DATA

In cases where NYSDOH ELAP Certification exists for a specific group or category of parameters, the laboratories performing analysis in connection with this project will have appropriate NYSDOH ELAP Certification. Analytical Service Protocol (ASP, June 2000) Category B deliverables are required for all samples.

Detection limits set by NYSDEC-ASP (June 2000) will be used for all sample analyses unless otherwise noted. If NYSDEC-ASP-dictated detection limits prove insufficient to assess project goals (i.e., comparison to drinking water standards or attainment of ARARs), then ASP Special Analytical Services (SAS) or other appropriate methods will be utilized.

The quality assurance/quality control objectives for all measurement data include completeness, representativeness, comparability, precision and accuracy.

3.1 COMPLETENESS

The analyses performed must be appropriate and inclusive. The parameters selected for analysis are chosen to meet the objectives of the study.

Completeness of the analyses will be assessed by comparing the number of parameters intended to be analyzed with the number of parameters successfully determined and validated. Data must meet QC acceptance criteria for 100 percent or more of requested determinations.

3.2 REPRESENTATIVENESS

Samples must be taken of the population and, where appropriate, the population will be characterized statistically to express the degree to which the data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process, or environmental condition.

Non-dedicated sampling devices will be cleaned between sampling points by washing and rinsing with pesticide-grade methanol, followed by a thorough rinse with distilled water. Specific cleaning techniques are described in the Field Sampling Procedure. Two types of blank samples will accompany each sample set where Target Compound List (TCL) volatiles are to be analyzed (water matrix only). A trip blank, consisting of a 40 ml VOA vial of organic-free water prepared by the laboratory, will accompany each set of sample bottles from the laboratory to the field and back. This bottle will remain sealed throughout the shipment and sampling process. This blank will be analyzed for TCL volatile organic compounds along with the groundwater samples to ensure that contamination with TCL volatile compounds has not occurred during the bottle preparation, shipment and sampling phase of the project. In order to check for contaminant carryover when non-dedicated sampling equipment is used, a rinsate blank will be submitted to the laboratory. This blank will also be analyzed for TCL volatile organic compounds. The TCL compounds are identified in the United States Environmental Protection Agency (USEPA) Contract Laboratory Program dated October 2016.

The analysis results obtained from the determination of identical parameters in field duplicate samples can be used to further assess the representativeness of the sample data.

3.3 COMPARABILITY

Consistency in the acquisition, preparation, handling and analysis of samples is necessary in order for the results to be compared where appropriate. Additionally, the results obtained from analyses of the samples will be compared with the results obtained in previous studies, if available.

To ensure the comparability of analytical results with those obtained in previous or future testing, all samples will be analyzed by NYSDEC-approved methods. The NYSDEC-ASP mandated holding times for various analyses will be strictly adhered to.

3.4 PRECISION AND ACCURACY

The validity of the data produced will be assessed for precision and accuracy. Analytical methods which will be used include gas chromatography/mass spectrometry (GC/MS), gas chromatography (GC), colorimetry, atomic spectroscopy, gravimetric and titrametric techniques. The following outlines the procedures for evaluating precision and accuracy, routine monitoring procedures, and corrective actions to maintain analytical quality control. All data evaluations will be consistent with NYSDEC-ASP procedures (June 2000). Data will be 100 percent compliant with NYSDEC-ASP requirements.

The number of duplicate, spiked and blank samples analyzed will a minimum of 1 duplicate for every 20 samples per each medium of groundwater and soil. The inclusion and frequency of analysis of field blanks will be on the order of one per every 20 samples (soil) but not more than one per day. For the aqueous matrix field blanks will be collected at a frequency of one per day. Samples to be analyzed for volatile organic compounds will be accompanied by a trip blank for each shipment and field blanks (water matrix) or field blanks (soil).

Quality assurance audit samples will be prepared and submitted by the laboratory QA manager for each analytical procedure used. The degree of accuracy and the recovery of analyte to be expected for the analysis of QA samples and spiked samples is dependent upon the matrix, method of analysis, and compound or element being determined. The concentration of the analyte relative to the detection limit is also a major factor in determining the accuracy of the measurement. The lower end of the analytical range for most analyses is generally accepted to be five times the detection

limit. At or above this level, the determination and spike recoveries for metals in water samples will be expected to range from 75 to 125 percent. The recovery of organic surrogate compounds and matrix spiking compounds determined by GC/MS will be compared to the guidelines for recovery of individual compounds as established by the United States Environmental Protection Agency Contract Laboratory Program dated 7/85 or as periodically updated.

The quality of results obtained for inorganic ion and demand parameters will be assessed by comparison of QC data with laboratory control charts for each test.

4.0 SAMPLING PROCEDURES

4.1 SAMPLING PROGRAM

The sampling program for this project will include soil, groundwater and soil vapor. Soil samples will be collected from split spoon sampling or macrocore devices retrieved from soil borings. Groundwater samples will be collected from groundwater monitoring wells using low flow purging techniques. Soil vapor samples will be collected from vapor points screened in the vadose zone using Summa Canisters.

4.1.1 Drilling/Sampling Procedures

Soil and groundwater samples will be collected by means of a soil boring program. Soil borings shall be completed using the hollow stem auger drilling methods, direct push methods, or rotary drilling methods, whichever methods are determined to be best suited to site conditions by the SESI project manager and SESI field team leader.

Soil samples will be collected from soil borings and analyzed in accordance with the NYSDEC-approved Work Plan. Monitoring wells for groundwater sample collection will be installed in select completed soil borings. Either hollow stem auger (HSA) or direct push drilling methods may be utilized for monitoring well completion.

Samples of the encountered overburden materials shall be collected continuously during drilling so that a complete soil profile is examined and described by the SESI field geologist. The sampling method employed shall be ASTM D-1586/Split Barrel Sampling using a standard 2-foot long, 2-inch outside diameter split- spoon sampler with a 140-pound hammer, in cases where HSA methods are used. Upon retrieval of the sampling barrel, the collected sample shall be placed in glass jars and labeled, stored on site (on ice in a cooler if necessary), and transmitted to the appropriate testing laboratory or

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storage facility. Chain-of-custody procedures will be practiced following Section 15, EPA-600/4-82-029, Handbook for Sampling and Sample Preservation of Water and Waste Waters.

A geologist or engineer will be on site during the drilling operations to fully describe each soil sample, following the New York State Soil Description Procedure, and to retain representative portions of each sample.

The drilling contractor will be responsible for obtaining accurate and representative samples, informing the geologist of changes in drilling pressure, keeping a separate general log of soils encountered including blow counts [i.e., the number of blows from a soil sampling drive weight (140 pounds)] required to drive the split-spoon sampler in 6-inch increments and installing monitoring wells to levels directed by the supervising geologist following specifications further outlined in this protocol.

4.1.2 Monitoring Well Completion

Monitoring wells will be constructed of 0.010-inch slot size PVC well screen and riser casing. Other materials utilized for completion will be washed silica sand (Q-Rock No. 4 or approved equivalent) bentonite grout, Portland cement, and a protective steel locking well casing and cap with locks. The depth of the wells will be determined based on the depth to water, type of contaminant and field conditions encountered.

The monitoring well installation method for wells installed within unconsolidated sediments shall be to place the screen and riser assembly into the casing once the screen interval has been selected. At that time, a washed silica sand pack will be placed around the well screen if required to prevent screen plugging. If a sand pack is not warranted, the auger string will be pulled back to allow the native aquifer material to collapse 2 to 3 feet above the top of the screen. Bentonite pellets will then be added to the annulus between the casing and the inside auger to insure proper sealing. Cement/bentonite grout will continue to be added during the extraction of the augers until the entire aquifer thickness has been sufficiently sealed off from horizontal and/or vertical flow above the screened interval. During placement of sand and bentonite pellets, frequent measurements will be made to check the height of the sand pack and thickness of bentonite layers by a weighted drop tape measure.

A bolt-down protective curb box will be installed, flush with the ground, or steel "stick-up" protective casing and secured by a Portland cement seal. The cement seal shall extend

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laterally at least 1 foot in all directions from the protective casing and shall slope gently away to drain water away from the well.

4.1.3 Well Development

All monitoring wells will be developed or cleared of all fine-grained materials and sediments that have settled in or around the well during installation so that the screen is transmitting representative portions of the groundwater. The development will be by one of two methods, pumping or bailing groundwater from the well until it yields relatively sediment-free water.

A decontaminated pump or bailer will be used and subsequently decontaminated after each use following procedures outlined in the Decontamination Protocol. Pumping or bailing will cease when the turbidity falls below 50 NTUs or until specific conductivity, pH, and temperature are stable (i.e., consecutive readings are within 10 percent with no overall upward or downward trends in measurements). Well development water will be contained in drums and properly disposed off-site.

4.1.4 Decontamination

All drilling equipment and associated tools including augers, drill rods, sampling equipment, wrenches and any other equipment or tools that have come in contact with contaminated materials will be decontaminated before any drilling on site begins, between each well, and prior to removing any equipment from the site. The preferred decontamination procedure will be to scrape the equipment from any residual soils and then rinse with water and Alconox®. Every effort will be made to minimize the generation of contaminated water, which will be drummed, to extent possible, for disposal.

4.2 GROUNDWATER SAMPLING PROGRAM.

4.2.1 Well Evacuation

Prior to sampling a monitoring well, the static water level will be recorded. All well data will be recorded on a field sampling record. The wells will be sampled in accordance with the USEPA guidelines for the Low Flow Purging Sampling (LFPS). The purpose of LFPS is to collect groundwater samples from monitoring wells that are representative of ambient groundwater conditions in the aquifer. The LFPS method reduces turbidity which is needed particularly when sampling for metals.

4.2.2 Sampling Procedure

The wells will be sampled using the LFPS technique. A flow rate of 100 ml to 250 ml per minute is used to purge the wells. Drawdown should not exceed 0.3 feet. QED bladder pumps or peristaltic pumps are used for this method. The pump intake is lowered to the mid-point of the water column or as subsurface features such as bedrock fractures or more permeable zones warrant. At the initiation of low flow purging a water level is recorded as well as field parameters. Field parameters are then monitored every five minutes during low flow purging using a flow through cell. When three consecutive measurements of pH differ by 0.1 units or less, with ORP within 10 mv or less, turbidity varies 10 percent or less, conductivity differs by 3 percent or less and dissolved oxygen by 10 percent or less, sampling may begin. Flow through cells are used so continuous real time readings are made. When the parameters stabilize the flow through cell is disconnected and sample bottles are filled directly from the tubing.

4.3 Soil Vapor Sampling

Soil vapor sampling will be conducted in accordance with NYSDOH Guidance for Evaluating Soil Vapor Intrusion in New York State (October 2006). Soil vapor samples will be collected in the vadose zone from shallow (5 feet) well points. Each vapor point will be installed in a shallow boring drilled either by hand-operated equipment (e.g. hand auger or percussion hammer drill), or by a small truck-mounted drill rig. Drilling equipment used shall be based on soil conditions, and the method that provides the most practical approach.

Each vapor point will consist of an inert sampling tube (polyethylene, stainless steel, or Teflon®) with a 6-inch screened section at the bottom through which soil vapors can be sampled. The screen slot size will be 0.0075 inches. A sampling zone will be created around the screened section by backfilling with 1 to 2 feet of porous coarse sand or glass beads, and at least three feet of bentonite will be placed above the porous sampling zone to form a seal from the surface. Native clean soil will be packed around the remaining annulus to the ground surface.

Each designated soil vapor sampling location will be purged of a minimum of three volumes using a low volume pump, and then attached to a regulator, and secured with a clamp. The regulator will then be attached to a 1-liter summa canister.

The regulator will be set to collect a soil vapor sample at a flow rate of less than 0.2 liters per minute. After the summa canister is filled, the valve will be closed.

Each canister will be listed according to a specific sample I.D. on a chain of custody form. Sample canisters will be delivered to the laboratory within 24 hours and analyzed for VOCs by method TO-15. The detection limit for VOCs will be 1 µg/m³ or less.

The soil vapor sampling effort will include the use of inert helium tracer gas to verify that the soil vapor samples are not diluted by ambient air. The atmosphere around the sampling tube will be enriched with the tracer gas, and the soil vapor sample will be collected in the presence of the enriched tracer atmosphere. This will be accomplished by placing an inverted plastic pail over the sampling point and filling the pail with the tracer gas via a small tube penetrating the site of the pail. Refer to NYSDOH Guidance for Evaluating Soil Vapor Intrusion in New York State (October 2006).

Weather conditions in the 48 hours prior to the test, and during the test, will be noted, including average wind speed, precipitation, temperature, and barometric pressure.

4.4 SAMPLE PRESERVATION AND SHIPMENT

Since all bottles will contain the necessary preservatives as shown in Table 4.1, they need only be filled. The 40 ml VOA vials must be filled brim full with no air bubbles. The other bottles should be filled to within about 1 inch from the top.

The bottles will be sent from the laboratory in coolers which will be organized on a per site basis. Following sample collection, the bottles should be placed on ice in the shipping cooler. The samples will be cooled to 4°C, but not frozen.

Final packing and shipment of coolers will be performed in accordance with guidelines outlined in the ASP.

5.0 SAMPLE CUSTODY

The program for sample custody and sample transfer is in compliance with the NYSDEC-ASP, as periodically updated. If samples may be needed for legal purposes, chain-of-custody procedures, as defined by NEIC Policies and Procedures (USEPA-330/9-78-001-R, Revised June 1988) will be used. Sample chain-of-custody is initiated by the laboratory with selection and preparation of the sample containers. To reduce the chance for error, the number of personnel handling the samples should be minimized.

5.1 FIELD SAMPLE CUSTODY

A chain-of-custody record accompanies the samples from initial sample container selection and preparation at the laboratory, shipment to the field for sample containment and preservation, and return to the laboratory. Two copies of this record follow the samples to the laboratory. The laboratory maintains one file copy and the completed original is returned to the site inspection team. Individual sample containers provided by the laboratory are used for shipping samples. The shipping containers are insulated and ice is used to maintain samples at approximately 4°C until samples are returned and in

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the custody of the laboratory. All sample bottles within each shipping container are individually labeled and controlled. Samples are to be shipped to the laboratory within 24-48 hours of the day of collection depending on parameter holding times.

Each sample shipping container is assigned a unique identification number by the laboratory. This number is recorded on the chain-of-custody record and is marked with indelible ink on the outside of the shipping container. The field sampler will indicate the sample designation/location number in the space provided on the appropriate chain-of-custody form for each sample collected. The shipping container is closed and a seal provided by the laboratory is affixed to the latch. This seal must be broken to open the container, and this indicates possible tampering if the seal is broken before receipt at the laboratory. The laboratory will contact the site investigation team leader and the sample will not be analyzed if tampering is apparent.

5.2 LABORATORY SAMPLE CUSTODY

The site investigation team leader or Project Quality Assurance Officer notifies the laboratory of upcoming field sampling activities and the subsequent transfer of samples to the laboratory. This notification will include information concerning the number and type of samples to be shipped as well as the anticipated date of arrival.

The laboratory sample program meets the following criteria:

- The laboratory has designated a sample custodian who is responsible for maintaining custody of the samples and for maintaining all associated records documenting that custody.
- Upon receipt of the samples, the custodian will check the original chain-ofcustody documents and compare them with the labeled contents of each sample container for correctness and traceability. The sample custodian signs the chainof-custody record and records the date and time received.
- Care is exercised to annotate any labeling or descriptive errors. In the event of
 discrepant documentation, the laboratory will immediately contact the site
 investigation team leader as part of the corrective action process. A qualitative
 assessment of each sample container is performed to note any anomalies, such
 as broken or leaking bottles. This assessment is recorded as part of the
 incoming chain-of-custody procedure.
- The samples are stored in a secured area at a temperature of approximately 4°C until analyses are to commence.
- A laboratory chain-of-custody record accompanies the sample or sample fraction through final analysis for control.
- A copy of the chain-of-custody form will accompany the laboratory report and will become a permanent part of the project records.

5.3 FINAL EVIDENCE FILES

Final evidence files include all originals of laboratory reports and are maintained under documented control in a secure area.

A sample or an evidence file is under custody if:

- It is in your possession; it is in your view, after being in your possession.
- It was in your possession and you placed it in a secure area.
- It is in a designated secure area.

6.0 CALIBRATION PROCEDURES

Instruments and equipment used to gather, generate or measure environmental data will be calibrated with sufficient frequency and in such a manner that accuracy and reproducibility of results are consistent with the appropriate manufacturer's specifications or project specific requirements. The procedures for instrument calibration, calibration verification, and the frequency of calibrations are described in the ASP. The calibration of instruments used for the determination of metals will be as described in the appropriate CLP standard operating procedures.

Calibration of other instruments required for measurements associated with these analyses will be in accordance with the manufacturer's recommendations and the standard operating procedures of the laboratory.

7.0 ANALYTICAL PROCEDURES

Analytical procedures shall conform to the most recent revision of the NYSDEC-ASP (June 2005) and are summarized on Table 7.1. In the absence of USEPA or NYSDEC guidelines, appropriate procedures shall be submitted for approval by NYSDEC prior to use.

The procedures for the sample preparation and analysis for organic compounds are as specified in the NYSDEC-ASP. Analytical cleanups are mandatory where matrix interferences are noted. No sample shall be diluted any more than 1 to 5 times. The sample shall be either re-extracted, re-sonicated, re-stream distilled, etc. or be subjected to any one analytical cleanup noted in SW846 or a combination thereof. The analytical laboratory shall expend such effort and discretion to demonstrate good laboratory practice and demonstrate an attempt to best achieve the method detection limit.

7.1 VOLATILE ORGANICS (VOA)

For the analysis of water samples for Target Compound List (TCL), volatile organic compounds (VOCs), no sample preparation is required. The analytical procedure for volatiles is detailed in NYSDEC-ASP (Volume I, Section D-I). A measured portion of the

sample is placed in the purge and trap apparatus and the sample analysis is performed by gas chromatography/mass spectrometry for the first round. USEPA Method 8260C will be used, plus tentatively identified compounds (TICs). USEPA Methods 8010 or 8020 (gas chromatography with different detectors) will be used if subsequent rounds with lower limits of detection are warranted.

7.2 SEMI-VOLATILE ORGANIC COMPOUNDS

The extraction and analytical procedures used for preparation of water, soil and sediment samples for the analysis of the TCL semi-volatile organic compounds are described in NYSDEC-ASP Volume I, Section D-III. USEPA Method 8270D will be used, plus tentatively identified compounds (TICs).

Instrument calibration, compound identification, and quantitation are performed as described in Section 6 of this document and in the NYSDEC-ASP.

7.3 PESTICIDE AND PCB COMPOUNDS

The sample preservation procedures for gas chromatography for pesticides and PCB's will be as described in the NYSDEC-ASP methods (Section D-IV). The analysis of standard mixes, blanks and spiked samples will be performed at the prescribed frequency with adherence to the 72-hour requirement described in the method.

7.4 METALS

Water, soil and waste samples will be analyzed for the metals listed in Table 7.1. The detection limits for these metals are as specified in the NYSDEC-ASP, Section D-V. The instrument detection limits will be determined using calibration standards and procedures specified in the NYSDEC-ASP. The detection limits for individual samples may be higher due to the sample matrix. The procedures for these analyses will be as described in the NYSDEC-ASP.

The analyses for metals will be performed by atomic absorption spectroscopy (AAS) or inductively-coupled plasma emission spectroscopy (ICPES), as specified in the ASP with regard to AAS flame analysis.

7.5 SITE SPECIFICITY OF ANALYSES

Work plans prepared for remedial investigation waste sites contain recommendations for the chemical parameters to be determined for each site. Thus, some or all of the referenced methods will apply to the analysis of samples collected at the individual waste sites. Analyses of Target Compound List (TCL) analytes will be performed on all samples.

PARAMETER & ANALYTICAL METHOD	NO.	BOTTLE TYPE	PRESERVATIVE ⁽¹⁾	HOLDING TIME			
Aqueous Samples							
SVOCs (BNAs) – USEPA 8270D or E	2	1-liter amber glass bottle	None	7 days (until extraction) 40 days (extracted)			
Pesticides – USEPA 8081B	2	1-liter amber glass bottle	None	7 days (until extraction) 40 days (extracted)			
PCBs – USEPA 8082A	2	1-liter amber glass bottle	None	7 days (until extraction) 40 days (extracted)			
VOCs – USEPA 8260C or D	2	40 mL, glass vial with septum cap	Hydrochloric Acid to pH <2	14 days			
Metals ^{(2) –} 6010C or D, Mercury 7470A	1	1-liter, plastic bottle	Nitric acid to pH <2	180 days Mercury: 28 days			
Cyanide – SM 4500- CN-E	1	1-liter, plastic	Sodium Hydroxide to pH >12	14 days			
Soil, Sediment, Solid Wa	aste Sample	S					
VOCs – USEPA 8260C or D	3	15-gram EnCore samplers	None	14 days			
SVOCs (BNAs) – USEPA 8270D or E	1	4-oz. glass jar with Teflon lid	None	14 days (until extraction, 40 days extracted)			
Pesticides – USEPA 8081B	1	4-oz. glass jar with Teflon lid	None	14 days (until extraction) 40 days (extracted)			
PCBs – USEPA 8082A	1	4-oz. glass jar with Teflon lid	None	none			
Metals ^{(2) –} 6010C or D, Mercury 7471B	1	4-oz. glass jar with Teflon lid	None	180 days Cyanide: 14 days Mercury: 28 days			
Soil Vapor / Indoor Air Samples							
VOCs – USEPA TO-15	1	Summa Canister	None	30 days			

⁽¹⁾ All samples will be preserved with ice during collection and shipment to 0-6 degrees C.
(2) From verified time of sample receipt by the analytical laboratory (within 24 to 48 hours of collection).
(3) A complete list of compounds is provided on Table 7.1.

TABLE 4.2 – SAMPLING PROCEDURE FOR MONITORING WELLS USING VOLUME AVERAGED PURGING

- 1. Initial static water level recorded with an electric contact probe accurate to the nearest 0.1 foot.
- 2. Sampling device and electric contact probe decontaminated.
 - a. Sampling device and probe are rinsed with pesticide-grade methanol and distilled water.
 - b. Methanol is collected into a large funnel which empties into a five- gallon container.
- 3. Sampling device lowered into well.
 - a. Bailer lowered by dedicated PVC or polypropylene line.
- 4. Sample taken.
 - a. Sample is poured slowly from the open end of the bailer with the sample bottle tilted so that aeration and turbulence are minimized.
 - b. Duplicate sample is collected when appropriate.
- 5. Samples are capped, labeled and placed in laboratory coolers with ice packs or bagged ice.
- 6. All equipment is cleaned with successive rinses of pesticide-grade methanol and distilled water.
 - a. Dedicated line is disposed of or left at well site.
- 7. Equipment/wash blanks are collected when non-dedicated sampling equipment is used.
- 8. Chain-of-custody forms are completed in triplicate.
 - a. The original and one carbon copy are put into a zip-lock bag and placed into the cooler.
- 9. The original will be returned following sample analysis.
 - a. A second carbon copy is kept on file.
- 10. Cooler is sealed with strapping tape and chain-of-custody seals to assure integrity and to prevent tampering of sample.

TABLE 4.3 – SAMPLING PROCEDURE FOR MONITORING WELLS USING LOW-STESS (LOW-FLOW) METHODS

- 1. Initial static water level recorded with an electric contact probe accurate to the nearest 0.1 foot.
- 2. Sampling device is lowered into well. Slowly lower the pump, safety cable, tubing and electrical lines into the well to the depth specified for that well. Pump intake must be no less than 2 feet from the bottom of the well to prevent disturbance and resuspension of sediments which may be at the bottom of the well.
- 3. Measure water level again: Before starting the pump, measure the water level again with the pump in the well. Leave the water level measuring device in the well.
- 4. Purge Well: Start pumping the well at 200 to 500 milliliters per minute (ml/min). The water level should be monitored approximately every five minutes. Ideally, a steady flow rate should be maintained that results in a stabilized water level (drawdown of 0.3 ft or less). Pumping rates should, if needed, be reduced to the minimum capabilities of the pump to ensure stabilization of the water level. As noted above, care should be taken to maintain pump suction and to avoid entrainment of air in the tubing. Record each adjustment made to the pumping rate and the water level measured immediately after each adjustment.
- 5. Monitor Indicator Parameters: During purging of the well, monitor and record the field indicator parameters (turbidity, temperature, specific conductance, pH, Eh, and DO) approximately every five minutes. The well is considered stabilized and ready for sample collection when the indicator parameters have stabilized for three consecutive readings as follows (Puls and Barcelona, 1996):
 - a. 0.1 for pH
 - b. 3% for specific conductance (conductivity)
 - c. 10 mv for redox potential
 - d. 10% for DO and turbidity
- 6. Dissolved oxygen and turbidity usually require the longest time to achieve stabilization. The pump must not be removed from the well between purging and sampling.
- 7. Collect Samples: Collect samples at a flow rate between 100 and 250 ml/min and such that drawdown of the water level within the well does not exceed the maximum allowable drawdown of 0.3 ft. VOC samples must be collected first and directly into sample containers. All sample containers should be filled with minimal turbulence by allowing the ground water to flow from the tubing gently down the inside of the container.
- 8. Ground water samples to be analyzed for volatile organic compounds (VOCs) require pH adjustment. The appropriate EPA Program Guidance should be consulted to determine whether pH adjustment is necessary. If pH adjustment is necessary for VOC sample preservation, the amount of acid to be added to each sample vial prior to sampling should be determined, drop by drop, on a separate and

- equal volume of water (e.g., 40 ml). Groundwater purged from the well prior to sampling can be used for this purpose.
- 9. Remove Pump and Tubing: After collection of the samples, the tubing, unless permanently installed, must be properly discarded or dedicated to the well for resampling by hanging the tubing inside the well.
- 10. Measure and record well depth.
- 11. Close and lock the well.
- 12. Samples are capped, labeled and placed in laboratory coolers with ice packs or bagged ice.
- 13. All equipment is cleaned with successive rinses of pesticide-grade methanol and distilled water.
 - a. Dedicated line is disposed of or left at well site.
- 14. Equipment/wash blanks are collected when non-dedicated sampling equipment is used.
- 15. Chain-of-custody forms are completed in triplicate.
 - a. The original and one carbon copy are put into a zip-lock bag and placed into the cooler. The original will be returned following sample analysis.
 - b. A second carbon copy is kept on file.
- 16. Cooler is sealed with strapping tape and chain-of-custody seals to assure integrity and to prevent tampering of sample.

TABLE 7-1 – CONTRACT-REQUIRED QUANTITATION LEVELS AND ANALYTICAL METHODS FOR ASP INORGANICS, ASP VOLATILES, ASP SEMI-VOLATILES, ASP PESTICIDES, AND PCBS

Target Compound List (TCL) and Contract-Required Quantitation Limit

SECTION 1 - ASP INORGANICS Method: NYSDEC-ASP-91-4					
	PARAMETER	CONTRACT- REQUIRED DETECTION LEVEL* (µg/L)		PARAMETER	CONTRACT- REQUIRED DETECTION LEVEL* (µg/L)
1.	Aluminum	200	13.	Magnesium	5,000
2.	Antimony	60	14.	Manganese	15
3.	Arsenic	15	15.	Mercury	0.2
4.	Barium	200	16.	Nickel	40
5.	Beryllium	5	17.	Potassium	5,000
6.	Cadmium	5	18.	Selenium	35
7.	Calcium	5,000	19.	Silver	10
8.	Chromium	10	20.	Sodium	5,000
9.	Cobalt	50	21.	Thallium	25
10.	Copper	25	22.	Vanadium	50
11.	Iron	100	23.	Zinc	60
12.	Lead	10	24.	Cyanide	10

	SECTION 2 - ASP ORGANICS (VOLATILES) Method: NYSDEC-ASP-91-1					
	VOLATILE	CONTRACT- REQUIRED QUANTITATION LIMIT** (µg/L)		VOLATILE	CONTRACT- REQUIRED QUANTITATION LIMIT** (µg/L)	
1.	Chloromethane	5.0	18.	1,2-Dichloropropane	5.0	
2.	Bromomethane	5.0	19.	cis-1,3- Dichloropropene	5.0	
3.	Vinyl Chloride	5.0	20.	Trichloroethene	5.0	
4.	Chloroethane	5.0	21.	Dibromochloromethane	5.0	
5.	Methylene Chloride	5.0	22.	1,1,2-Trichloroethane	5.0	
6.	Acetone	10.0	23.	Benzene	5.0	
7.	Carbon Disulfide	5.0	24.	Trans-1.3- Dichloropropene	5.0	
8.	1,1-Dichloroethylene	5.0	25.	Bromoform	5.0	
9.	1,1-Dichloroethane	5.0	26.	2-Hexanone	10.0	
10.	1,2-Dichloroethylene (total)	5.0	27.	4-Methyl, 1,2- Pentanone	10.0	
11.	Chloroform	5.0	28.	Tetrachloroethylene	5.0	
12.	1,2-Dichloroethane	5.0	29.	Toluene	5.0	
13.	2-Butanone	10.0	30.	Chlorobenzene	5.0	
14.	1,1,1-Trichloroethane	5.0	31.	Ethylbenzene	5.0	
15.	Carbon Tetrachloride	5.0	32.	Styrene	5.0	
16.	Bromodichloromethane	5.0	33.	Total Xylenes	5.0	
17.	1,1,2,2- Tetrachloroethane	5.0				

SECTION 3 - ASP ORGANICS (SEMI-VOLATILES) Method: NYSDEC-ASP-91-2					
	SEMI-VOLATILE	CONTRACT- REQUIRED QUANTITATION LIMIT (µg/I)		SEMI-VOLATILE	CONTRACT- REQUIRED QUANTITATION LIMIT (µg/I)
1.	Phenol	5.0	33.	Acenaphthene	5.0
2.	Bis(2-chloroethyl)ether	5.0	34.	2,4-Dinitrophenol	10.0
3.	2-Chlorophenol	5.0	35.	4-Nitrophenol	10.0
4.	1,3-Dichlorobenzene	5.0	36.	Dibenzofuran	5.0
5.	1,4-Dichlorobenzene	5.0	37.	Dinitrotoluene	5.0
6.	1,2-Dichlorobenzene	5.0	38.	Diethylphthalate	5.0
7.	2-Methylphenol	5.0	39.	4-Chlorophenyl phenyl ether	5.0
8.	2,2'oxybis(1- Chloropropane)	5.0	40.	Fluorene	5.0
9.	4-Methylphenol	5.0	41.	4-Nitroanile	10.0
10.	N-Nitroso-dipropylamine	5.0	42.	4,6-Dinitro-2- methylphenol	10.0
11.	Hexachloroethane	5.0	43.	N-nitrosodiphenyl amine	5.0
12.	Nitrobenzene	5.0	44.	4-Bromophenyl phenyl ether	5.0
13.	Isophorone	5.0	45.	Hexachlorobenzene	5.0
14.	2-Nitrophenol	5.0	46.	Pentachlorophenol	10.0
15.	2,4-Dimethylphenol	5.0	47.	Phenanthrene	5.0
16.	Bis(2-Chloroethoxy) methane	5.0	48.	Anthracene	5.0
17.	2,4-Dichlorophenol	5.0	49.	Carbazole	5.0
18.	1,2,4-Trichlorobenzene	5.0	50.	Di-n-butyl phthalate	5.0
19.	Naphthalene	5.0	51.	Fluoranthene	5.0
20.	4-Chloroaniline	5.0	52.	Pyrene	5.0
21.	Hexachlorobutadiene	5.0	53.	Butyl benzyl phthalate	5.0
22.	4-Chloro-3-methylphenol	5.0	54.	3,3'-Dichloro benzidine	5.0
23.	2-Methylnaphthalene	5.0	55.	Benz(a)anthracene	5.0
24.	Hexachlorocyclopentadiene	5.0	56.	Chrysene	5.0
25.	2,4,6-Trichlorophenol	5.0	57.	Bis(2-ethylhexyl) phthalate	5.0
26.	2,4,5-Trichlorophenol	10.0	58.	Di-n-octyl phthalate	5.0
27.	2-Chloronapthalene	5.0	59.	Benzo(b)fluoranthene	5.0
28.	2-Nitroananiline	10.0	60.	Benzo(k)fluoranthene	5.0
29.	Dimethyl phthalate	5.0	61.	Benzo(a)pyrene	5.0
30.	Acenaphthylene	5.0	62.	Indeno(1,2,3-cd) pyrene	5.0
31.	2,6-Dinitrotoluene	5.0	63.	Dibenz(a,h) anthracene	5.0
32.	3-Nitroaniline	10.0	64.	Benzo(g,h,i)perylene	5.0

SECTION 3 - ASP ORGANICS (PESTICIDES/PCBS) Method: NYSDEC-ASP-91-3					
	PESTICIDE/PCB	CONTRACT- REQUIRED QUANTITATION LIMIT (µg/I)		PESTICIDE/PCB	CONTRACT- REQUIRED QUANTITATION LIMIT (µg/I)
1.	Alpha-BHC	0.05	15.	4,4'-DDT	0.10
2.	Beta-BHC	0.05	16.	Methoxychlor	0.5
3.	Delta-BHC	0.05	17.	Endrin ketone	0.10
4.	Gamma-BHC (lindane)	0.05	18.	Endrin aldehyde	0.10
5.	Heptachlor	0.05	19.	Alpha-Chlordane	0.05
6.	Aldrin	0.05	20.	Gamma-Chlordane	0.05
7.	Heptachlor epoxide	0.05	21.	Toxaphene	5.0
8.	Endosulfan I	0.05	22.	AROCHLOR-1016	1.0
9.	Dieldrin	0.10	23.	AROCHLOR-1221	1.0
10.	4,4'-DDE	0.10	24.	AROCHLOR-1232	1.0
11.	Endrin	0.10	25.	AROCHLOR-1242	1.0
12.	Endosulfan II	0.10	26.	AROCHLOR-1248	1.0
13.	4,4'-DDD	0.10	27.	AROCHLOR-1254	1.0
14.	Endosulfan sulfate	0.10	28.	AROCHLOR-1260	1.0

^{*}Matrix: groundwater. For soil matrix, multiply CRDL by 100.
**Quantitation limit for medium-level soil is 1,200 µg/kg (wet weight basis).

Appendix C: Emerging Contaminant Sampling Plan

White Plains Chrysler Car Dealership Site

WHITE PLAINS, NEW YORK BCP# C360209

SOIL AND GROUNDWATER SAMPLING PLAN FOR EMERGING CONTAMINANTS

Prepared for:

Saber-North White Plains, LLC c/o Saber Real Estate Advisors 80 Business Park Drive Armonk, New York 10504

Prepared by: SESI CONSULTING ENGINEERS, D.P.C. 12A Maple Avenue Pine Brook, NJ 07058

JUNE 2021

1.0 PROJECT DESCRIPTION

This document presents the soil and groundwater emergent contaminant sampling plan for the Remedial Investigation Workplan (RIWP) for the proposed development of the White Plains Chrysler Car Dealership (the Site). The Site consists of a 1.862-acre area parcel and is located at 70 Westchester Avenue, Westchester County, White Plains, New York. The Site is identified as 126.61-3-15.1 on the Westchester County tax map. The Site is bound by Franklin Avenue and retail businesses to the north, the White Coach Diner to the west, Westchester Avenue and the Westchester Mall to the south, and closed car dealership to the east.

The Site previously consisted of six (6) contiguous lots which have been merged on October 28, 2020. The Site is currently improved with an automotive sales and service dealer, associated building and asphalt paved parking spaces. The eastern portion of the building, which was constructed in 1925, consists of a single-story and two-story structure with small partial basement under the southeastern corner of the building. The western portion of the building which was constructed in 1990 consists of a single-story structure with a half basement. Historically, the Site was improved with residential dwellings, an automotive garage, and a machine shop, and auto sales and service facilities.

2.0 SOIL SAMPLING PLAN

The sampling will be performed in accordance with the New York State Department of Environmental Conservation (NYSDEC) Guidelines for Sampling and Analysis of PFAS Under NYSDEC's Part 375 Remedial Programs, dated January 2021. The soil samples will be sent via chain of custody to an ELAP-certified laboratory and analyzed for TCL/TAL+30, 1,4-dioxane and the PFAS compounds listed in Table 1. The soil samples will be analyzed for PFAS using Modified USEPA Method 537. Reporting limits for each PFAS compound will not exceed 1 microgram per kilogram (ug/kg). NYSDEC will be informed if detection limits on certain PFAS compounds cannot be met by the laboratory. Category B deliverables and an electronic data deliverable will be completed. A DUSR will be prepared by a data validator for all the analyses including PFAS and 1,4-dioxane. The method detection limit (MDL) for 1,4-dioxane will be no higher than 0.1 mg/kg (ppm).

Because PFAS compounds must be analyzed at concentrations in the ug/kg range, precautions must be taken to prevent cross-contamination during sampling events. Field sampling equipment that is used at multiple sites or sampling locations could become highly contaminated with PFAS. Soil sampling at this site will involve the use of non-dedicated equipment, such as a Geoprobe direct push drill rig, which could be a source of cross-contamination. Decontamination procedures outlined in this document will be followed to avoid cross contamination and equipment will be verified as PFAS-free. Special care and consideration will be given to the field sampling equipment when stored and handled outside the site boundaries or between different sample locations.

Items that may be directly in contact with the soil, including spoons, bowls, and direct push equipment, including any split spoon or sampling barrels, have a high likelihood of cross-contamination occurring if the proper decontamination procedures are not followed. These items should be known to be PFAS free. Item that will not directly contact the soil, including field books, Post-It® Notes, aluminum foil, recycled paper towels, binders, or spiral hard cover, can be a source of PFAS contamination. Every effort will be made to ensure these items are PFAS-free.

For the sampling equipment, the following items, materials, and procedures will be used for decontamination:

- Municipal drinking water may be used for decontamination if it is known to be PFAS-free.
 Commercially available deionized water in an HDPE container may also be used for decontamination.
- Standard two step decontamination using Alconox® detergent and PFAS-free triple water rinse will be performed for the sampling equipment.
- Sampling equipment may be scrubbed with polyethylene or a polyvinyl chloride (PVC) brush to remove particulates.
- The sampling equipment components will not come in contact with material that may potentially contain PFAS such as aluminum foil, low density polyethylene (LDPE), polytetrafluoroethylene (PTFE, Teflon®) or other fluoropolymers.
- Soil sampling equipment will be decontaminated between each sampling point and at the conclusion of the workday. This is to ensure sampling equipment is decontaminated ahead of time for the next sampling event.

Equipment rinsate blanks will be collected daily for the equipment that comes in contact with the soil samples and is decontaminated and reused. If all the sampling materials are disposable, no field blanks will be collected. Field duplicates will be collected on a frequency of 1/20 samples.

One matrix spike and matrix spike duplicate (MS/MSD) will also be collected on a frequency of 1/20 samples. A trip blank will accompany each laboratory shipment which includes analysis for volatile organic compounds.

3.0 GROUNDWATER SAMPLING PLAN

The sampling will be performed in accordance with the NYSDEC Guidelines for Sampling and Analysis of PFAS Under NYSDEC's Part 375 Remedial Programs, dated January 2021. The groundwater samples will be sent via chain of custody in a cooler at 4 degrees C to an ELAP-certified laboratory and analyzed for TCL/TAL+30, 1,4-dioxane and the PFAS compounds listed in Table 1. The groundwater samples will be analyzed for PFAS using Modified USEPA Method 537. Reporting limits for PFOA and PFOS will not exceed 2 nanogram per liter (ng/L). Category B deliverables and an electronic data deliverable will be completed. A DUSR will be prepared by a data validator for all the analyses including PFAS and 1,4-dioxane. The method detection limit (MDL) for 1,4-dioxane will be no higher than 0.28 µg/l (ppb). In order to get the appropriate detection limit, the lab will run EPA method 8270 in "selective ion monitoring" (SIM) mode for 1.4-dioxane.

PFAS are very persistent in the environment and in the human body. There is evidence that exposure to PFAS can lead to adverse human health effects. EPA established the health advisory levels for PFAS in drinking water at 70 parts per trillion. Due to their presence in a variety of products, persistence in the environment and very low drinking water standards, care must be used when groundwater sampling for PFAS to avoid cross contamination from the sampling equipment and personal protective equipment (PPE).

4.0 SOIL SAMPLE COLLECTION AND HANDLING

The following considerations will be observed:

- No fabric softener will be used on clothing to be worn by the sampling personnel in the field. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS-containing materials will be avoided.
- Cosmetics, moisturizers, hand cream, unauthorized sunscreen, insect repellant or other related products will not be used by the sampling staff on sampling days.
- Food and drink packaging materials such as pre-wrapped food or snacks (i.e. candy bars, microwave popcorn, etc.) will not be used in the sampling and staging areas.

- Sampling will be conducted with powderless nitrile gloves. The gloves will be changed frequently any time there is an opportunity for cross-contamination during sampling, including, but not limited to:
 - a. Immediately prior to sample collection
 - b. Each time sampling equipment is placed in and then removed from soil at a new location
 - c. Handling of any sample, including quality assurance/quality control (QA/QC) samples
 - d. After the handling of any non-dedicated sampling equipment
 - e. After contact with non-decontaminated surfaces
 - f. After decontamination of sampling equipment
 - g. When judged necessary by field personnel
- HDPE or polypropylene sample bottles with Teflon®-free caps, provided by the laboratory will be used. Sample containers will not come in contact with material that may potentially contain PFAS.
- Bottles will only be opened immediately prior to sampling.
- Dust and fibers will be kept out of sample bottles.
- The sample caps will never be placed directly on the ground during sampling. If the sampling staff must set the sample bottle cap down during sample collection and a second member of the sampling crew (wearing a fresh pair of powderless nitrile gloves) is not available, the cap will be set on a clean surface (cotton sheeting, HDPE sheeting, triple rinsed cooler lid, etc.).
- Regular size Sharpie® and thicker markers will be avoided. Fine and Ultra-Fine point Sharpie® markers may be used. Ballpoint pens may be used when labeling sample containers. If ballpoint pens do not write on the sample container labels, preprinted labels from the laboratory may be used.
- Sample bottles, coolers, sample labels and a chain of custody form will be provided by the analytical laboratory.
- PFAS samples will be collected prior to collecting non-PFAS samples.

4.0 SAMPLE SHIPMENT

In the absence of a formal USEPA guidance for PFAS sample storage, the documentation in USEPA Method 537 Rev. 1.1 will be used as a guide for thermal preservation and holding times for soil or other samples. Samples will be chilled during storage and shipment, and will not exceed 50°F (10°C) during the first 48 hours after collection.

The following procedures will be used by SESI for sample shipment:

- Regular ice will be used to cool and maintain the samples at or below 42.8°F (6°C).
 Chemical or blue ice may be used if it is known to be PFAS-free and the samples can be cooled and maintained at or below 42.8°F (6°C) during collection and through transit to the laboratory.
- The coolers will be periodically checked to ensure samples are well iced and at the proper temperature. Refresh with regular ice if needed. The ice may be double bagged in LDPE resealable storage bags. LDPE may be used if an equipment blank demonstrates the LDPE is PFAS-free.

- Chain of Custody and other forms will be single bagged in LDPE (e.g. Ziploc®) storage bags and taped to the inside of the cooler lid. LDPE may be used if an equipment blank demonstrates the LDPE is PFAS-free.
- The cooler(s) will be taped closed with a custody seal and picked up by a ELAP certified lab within 24 hrs.

Table 1: PFAS compounds list*

Group	Chemical Name	Abbreviation	CAS Number
	Perfluorobutanesulfonic acid	PFBS	375-73-5
5 6 " " "	Perfluorohexanesulfonic acid	PFHxS	355-46-4
Perfluoroalkyl sulfonates Perfluoroalkyl carboxylates	Perfluoroheptanesulfonic acid	PFHpS	375-92-8
	Perfluorooctanesulfonic acid	PFOS	1763-23-1
	Perfluorodecanesulfonic acid	PFDS	335-77-3
	Perfluorobutanoic acid	PFBA	375-22-4
Perfluoroalkyl sulfonates Perfluoroalkyl carboxylates Fluorinated Telomer Sulfonates Perfluorooctane-sulfonamides Perfluorooctane-sulfonamidoacetic	Perfluoropentanoic acid	PFPeA	2706-90-3
	Perfluorohexanoic acid	PFHxA	307-24-4
	Perfluoroheptanoic acid	PFHpA	375-85-9
	Perfluorooctanoic acid	PFOA	335-67-1
	Perfluorononanoic acid	PFNA	375-95-1
	Perfluorodecanoic acid	PFDA	335-76-2
	Perfluoroundecanoic acid	PFUA/PFUdA	2058-94-8
	Perfluorododecanoic acid	PFDoA	307-55-1
	Perfluorotridecanoic acid	PFTriA/PFTrDA	72629-94-8
	Perfluorotetradecanoic acid	PFTA/PFTeDA	376-06-7
Fluorinated Telomer	6:2 Fluorotelomer sulfonate	6:2 FTS	27619-97-2
Sulfonates	8:2 Fluorotelomer sulfonate	8:2 FTS	39108-34-4
	Perfluroroctanesulfonamide	FOSA	754-91-6
	N-methyl perfluorooctanesulfonamidoacetic acid	N-MeFOSAA	2355-31-9
	N-ethyl perfluorooctanesulfonamidoacetic acid	N-EtFOSAA	2991-50-6

^{*}Table source is NYSDEC Guidelines for Sampling and Analysis of PFAS Under NYSDEC's Part 375 Remedial Programs, dated January 2021.



CEC	31	PROJECT NAME:								MC	NITORING WELL NO.			
		PROJECT LOCATION:								JOB NO.				
CONSULT										GROUND ELEVATION:				
BORING BY:		DATE STARTED		DEVELOPMENT PERIOD				INSIDE CASING DIAMETER (in)						
INSPECTOR:		DATE COMPLETED				DEVEL	OPMEN	IT METI	HOD		BOREHOLE DIAMETER (in)			
NJ DEP PERMIT NO.:	NJ DEP PERMIT NO.: DATE DEVELOPED					DEVEL	OPMEN	IT RATE	Ξ	# gpm	INITIAL WATER LEVEL (ft):			
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Ground Surface	0	Casing Type:												
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Approximate Change in Strata: _____ Inferred Change in Strata: _____

The subsurface information shown hereon was obtained for the design and estimating purposes for our client. It is made available to authorized users only that they may have access to the same information available to our client. It is presented in good faith, but it is not intended as a substitute for investigations, interpretations or judgment of such authorized users. Information on the logs should not be relied upon without the geotechnical engineers recommendations contained in the report from which these logs were extracted. Soil descriptions represent a field identification after D. M. Burmister unless otherwise noted.

Appendix E: Health and Safety Plan (HASP)

SITE-SPECIFIC HEALTH AND SAFETY PLAN

White Plains Chrysler Car Dealership Site 70 Westchester Avenue White Plains, New York BCP # 360209

Prepared For:

Saber-North White Plains, LLC c/o Saber Real Estate Advisors 80 Business Park Drive Armonk, New York 10504

Prepared By:

SESI CONSULTING ENGINEERS 12A Maple Avenue Pine Brook, NJ 07058

Project No.: 11444

June 2021

Disclaimer: ☐ This Health and Safety Plan (HASP) is based upon information provided [and, if applicable, conditions discovered during a site visit], and is limited by the project scope.

The HASP should be periodically reviewed and updated based on a number of factors, including but not limited to: (1) changes in applicable governmental requirements; (2) changes in procedures at the site; and (3) site conditions which were unknown to SESI Consulting Engineers (SESI) as of the time the HASP was prepared.

This HASP has been prepared for the sole and exclusive use of Saber-North White Plains, LLC and may not be relied upon by any other person without the express written consent and authorization of SESI.

SITE-SPECIFIC HEALTH AND SAFETY PLAN

For

White Plains Chrysler Car Dealership Site 70 Westchester Avenue White Plains, New York BCP # 360209

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1.0 INTRODUCTION

1.1 Objective

1.2 Site and Facility Description

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1.3 Policy Statement

Health and Safety Plan White Plains Chrysler Car Dealership White Plains, New York

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responsible for preparing their own site-specific HASPs that meet the basic
requirements outlined in this HASP.
1.4 References
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•□ Occupational Safety and Health Guidance Manual for Hazardous Waste Site
■□ Title 29 of the Code of Federal Regulations □□ FR□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□
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Table 1 – Key Safety Personnel

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4.0 PERSONAL PROTECTIVE EQUIPMENT

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4.1.2 Modified Level D Protection

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4.1.3 Level C Protection
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4.2 Selection of PPE
4.3 Site Respiratory Protection Program
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4.5 Selection Matrix

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Table 2 – PPE Selection Matrix

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5.0 AIR AND NOISE MONITORING

5.1 Air Monitoring

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5.2 Noise Monitoring

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5.3 Monitoring Equipment Maintenance and Calibration

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5.4 Action Levels

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Table 3 - Airborne Contaminant Action Levels

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6.0 WORK ZONES AND DECONTAMINATION

6.1 Work Zones

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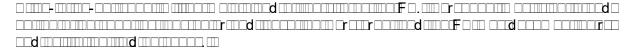
6.1.2 Site Orientation and Hazard Briefing

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6.1.3 Certification Documents

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6.1.4 Entry Log



6.1.5 Entry Requirements 6.1.6 Emergency Entry and Exit _ craiiroomoanaanamaa croocaan illinomerillinid oanoond illinomerillinid allinomerillinid illinomerillinid illi oooff namicanacamamranaaraaanaamaanaanaanaanaanaanaadaanaa araarracaanaanaadama 6.1.7 Contamination Control Zones 6.1.8 Exclusion Zone (EZ) anome weight, and who emperement measurement named and control and and normal and and an independent of the common and an independent 6.1.9 Contamination Reduction Zone d occomo (mond ome occocamo (mondo como (mondo como (mondo como (mondo como (mondo como (mondo (mond or in rough in a management of the common of _romamom ____amain_on_cond mamom Romed mroorred mr amonmomred moon_amonmonom 6.1.10 Support Zone (SZ) 6.1.11 Posting a crassronam amnoarron mooman crastanet d'amnoad anamoannoamnoamnoamnoamrano 6.1.12 Site Inspections DOOF DIE STEELE DE S

6.2 Decontamination

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7.0	TRAINING AND MEDICAL SURVEILLANCE
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7.1.3	Supervisor Course
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7.1.4	Site-Specific Training
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7.1.5	Daily Safety Meetings
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7.1.6	First Aid and CPR
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7.2.3 Other Medical Examinations
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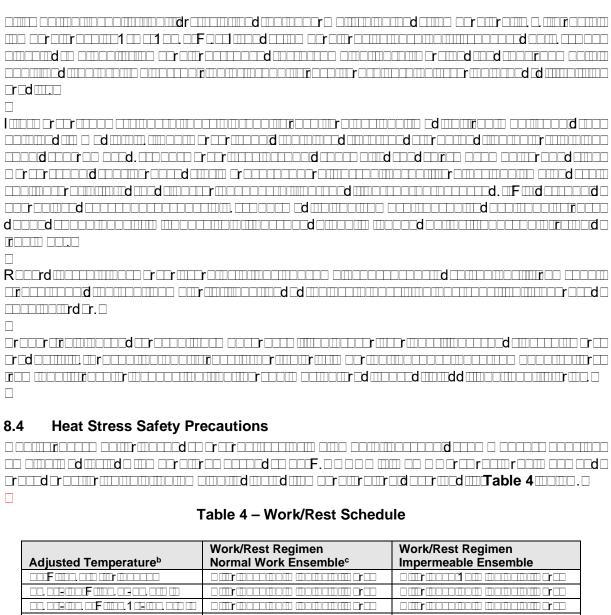
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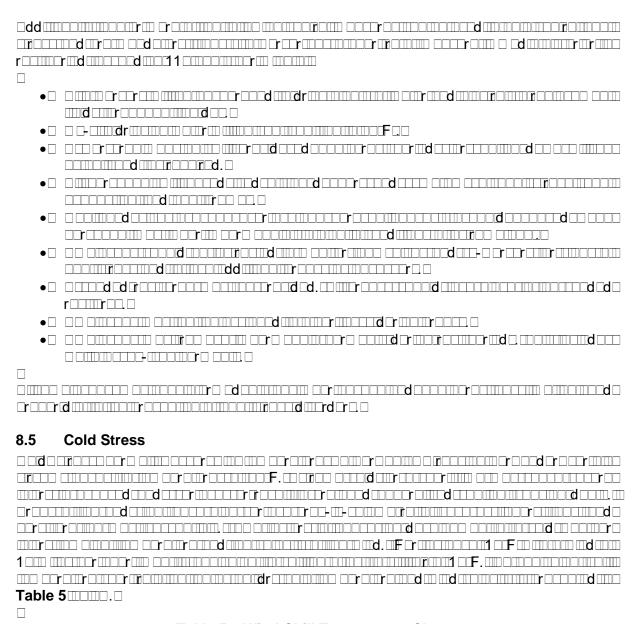


Table 5 – Wind Chill Temperature Chart

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Table 6 – List of Primary Contaminants

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PFAS	Maximum Concentration (mg/kg)	Applicable Monitoring Instrument			
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Media: Groundwater					
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10.0 EMERGENCY PROCEDURES

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10.2 Emergency Response

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10.2.1 Fire

10.2.2 Contaminant Release

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10.6 Emergency Information
Table 7 Emergency Contacts

Table 7 – Emergency Contacts

Local Emergency Contacts Telephone No. □11□ **1 1 1 1** □11□ □11□ R □11□ □11□ **Miscellaneous Contacts** Telephone No. ______ _____11-____

10.6.1 Directions to Hospital

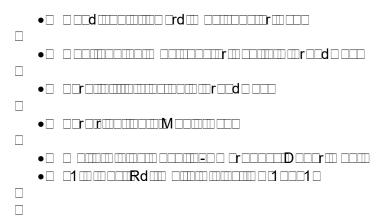
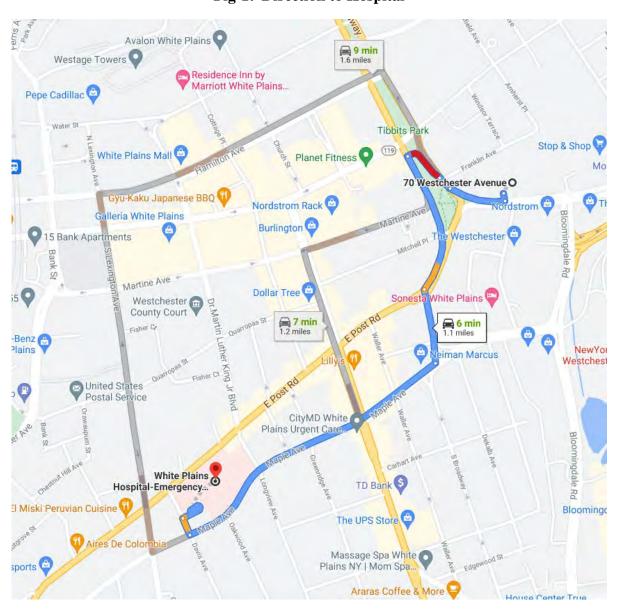


Fig-1: Direction to Hospital



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ATTACHMENT 1 AIR MONITOR LOG

Air Monitoring: Sample Collection and Analysis

Date & Time of Monitoring	Task / Operation Being	Substance(s)/ Hazard(s) Being	Monitoring Location	Type/Method of Monitoring	Monitoring Results	Exposure Limits	Required Action

ATTACHMENT 2 OSHA POSTER

Job Safety and Health It's the law!

OSHA®

Occupational Safety
and Health Administration
U.S. Department of Labor

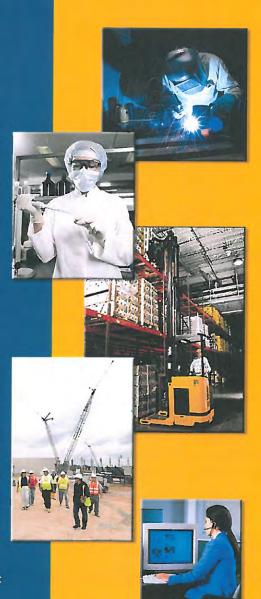
EMPLOYEES:

- You have the right to notify your employer or OSHA about workplace hazards. You may ask OSHA to keep your name confidential.
- You have the right to request an OSHA inspection if you believe that there are unsafe and unhealthful conditions in your workplace. You or your representative may participate in that inspection.
- You can file a complaint with OSHA within 30 days of retaliation or discrimination by your employer for making safety and health complaints or for exercising your rights under the OSH Act.
- You have the right to see OSHA citations issued to your employer. Your employer must post the citations at or near the place of the alleged violations.
- Your employer must correct workplace hazards by the date indicated on the citation and must certify that these hazards have been reduced or eliminated.
- You have the right to copies of your medical records and records of your exposures to toxic and harmful substances or conditions.
- · Your employer must post this notice in your workplace.
- You must comply with all occupational safety and health standards issued under the OSH Act that apply to your own actions and conduct on the job.

EMPLOYERS:

- You must furnish your employees a place of employment free from recognized hazards.
- You must comply with the occupational safety and health standards issued under the OSH Act.

This free poster available from OSHA – The Best Resource for Safety and Health



Free assistance in identifying and correcting hazards or complying with standards is available to employers, without citation or penalty, through OSHA-supported consultation programs in each state.

1-800-321-OSHA (6742)

www.osha.gov

OSHA 3166-02 2012R



ATTACHMENT 3 FILED CHANGE REQUEST FORM

HEALTH & SAFETY PLAN CHANGE NOTICE

Pages _____ of ____

Project:					H&S-CN
1) H.	ASP VERSIO	N:	SECTION:	P	AGE (s):
RI	E: 	Change to existing Addition to existing Other:	ng HASP	-	sion Date:
		——————————————————————————————————————			CONT
2) PI	ROPOSED CH	ANGE:			
	EASON FOR I	PROPOSED CHAN	NGE(s):	Other	
	 	Disposition of De	ficiency tory or Other Require		CONT
l) E2	XHIBITS ATT	ACHEDNO	YES (If YES	, describe)	CONT
5) PM	MK APPROVA	SITE	MANAGER:		Date:
Cl	lient Approval	Required:N	NO YES (If YI	ES, date submitted)	
,	LIENT APPRO			REMANDED _	
					CONT
Cl	ient Represent	ative:			Date:
7) Di	ISTRIBUTION	N AFTER APPROV	/AL		
$\frac{X}{X}$ X	CLIEN'		OTHER:		
B) PI	REPARED BY Title	<u></u>			Date:

ATTACHMENT 4 INJURY REPORT FORM

OSHA's Form 301 Injury and Illness Incident Report

occupational safety and health purposes. possible while the information is being used for protects the confidentiality of employees to the extent employee health and must be used in a manner that Attention: This form contains information relating to

U.S. Department of Labor Occupational Safety and Health Administration

Form approved OMB no. 1218-0176

and severity of work-related incidents. employer and OSHA develop a picture of the extent accompanying Summary, these forms help the first forms you must fill out when a recordable workthe Log of Work-Related Injuries and Illnesses and the related injury or illness has occurred. Together with This Injury and Illness Incident Report is one of the

asked for on this form. any substitute must contain all the information substitutes. To be considered an equivalent form, insurance, or other reports may be acceptable equivalent. Some state workers' compensation, illness has occurred, you must fill out this form or an information that a recordable work-related injury or Within 7 calendar days after you receive

this form on file for 5 years following the year to which it pertains 1904, OSHA's recordkeeping rule, you must keep According to Public Law 91-596 and 29 CFR

may photocopy and use as many as you need. If you need additional copies of this form, you

8) Was employee treated in an emergency room?	GiyStateZIP	Street	7) If treatment was given away from the worksite, where was it given? Facility	Information about the physician or other health care professional 6) Name of physician or other health care professional	3) Date of birth /	City State ZIP	2) Street	I) Full name	Information about the employee
(c) what object or substance directly harmed the employee? Examples: "cor "radial arm saw." If this question does not apply to the incident, leave it blank.			16) What was the injury or illness? Tell us th more specific than "hurt," "pain," or sore tunnel syndrome."	15) What happened? Tell us how the injury of fell 20 feet"; "Worker was sprayed with el developed soreness in wrist over time."	14) What was the employee doing just before the incident occurred? Do tools, equipment, or material the employee was using. Be specific. Exa carrying roofing materials"; "spraying chlorine from hand sprayer";	13) Time of event	12) Time employee began work	10) Case number from the Log	Information about the case
11) what object or substance directly harmed the employee? Examples: "concrete floor"; "chlorine"; "radial arm saw." If this question does not apply to the incident, leave it blank.			16) What was the injury or illness? Tell us the part of the body that was affected and how it was affected; be more specific than "hurt," "pain," or sore." Examples: "strained back."; "chemical burn, hand"; "carpal tunnel syndrome."	15) What happened? Tell us how the injury occurred. Examples: "When ladder slipped on wet floor, worker fell 20 feet", "Worker was sprayed with chlorine when gasket broke during replacement"; "Worker developed soreness in wrist over time."	14) What was the employee doing just before the incident occurred? Describe the activity, as well as the tools, equipment, or material the employee was using. Be specific. Examples: "climbing a ladder while carrying roofing materials"; "spraying chlorine from hand sprayer"; "daily computer key-entry."	AM / PM Gheck if time cannot be determined	Md / WV	(Fransfer the case number from the Log after you record the case.)	,

17) What object or substance directly harmed the employee? Examples: "concrete floor"; "chlorine"; "radial arm saw." If this question does not apply to the incident, leave it blank.

Public reporting burden for this collection of information is estimated to average 22 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Persons are not required to respond to the collection of information unless it displays a current valid OMB control number. If you have any comments about this estimate or any other aspects of this data collection, including suggestions for reducing this burden, contact. US Department of Labor, OSHA Office of Statistical Analysis, Room N-8542, 200 Constitution Avenue, NW. Washington, DC 20210. Do not send the completed forms to this office.

Phone (

Date

Was employee hospitalized overnight as an in-patient?

Ves

No

Completed by

Yes No

OSHA's Form 300 (Rev. 01/2004)

Log of Work-Related Injuries and Illnesses

occupational safety and health purposes. possible while the information is being used for protects the confidentiality of employees to the extent employee health and must be used in a manner that Attention: This form contains information relating to

Year 20

U.S. Department of Labor Occupational Safety and Health Administration

Form approved OMB no. 1218-0176

Identify the person		Describe the case	he case		Class	Classify the case	se		January Street	
(A) (B) Case Employee's name	(C) Job title	(D) Date of injury		(F) Describe injury or illness, parts of body affected,	CHECK OF based on that case:	ONLY ONE on the most	CHECK ONLY ONE box for each case based on the most serious outcome for that case:	h case tcome for	Enter the number of days the injured or ill worker was:	Check the "Injury" column or choose one type of illness:
no.	(e.g., Welder)	or onset of illness	(e.g., Loading dock north end)	and object/substance that directly injured or made person ill (e.g., Second degree burns on			Remain	Remained at Work		ory 1
				right Josearn, from acetylene torch)	Death	Days away from work	Job transfer or restriction	Other record- able cases	from transfer or work restriction	Injury Skin dis Respirat conditio Poisonir Hearing All other
					<u>@</u>	Ē] =] S	(F)	(2) (3) (4) (5)
		month Ja,			_		ב		days days	
		month/day			0				days days	
		month day				0	0		days days	
		month/day			0				days days	
		month/day							days days	
		month/da/							days days	
		month/day							days days	
		month day						0	days days	0 0 0 0 0
		month, tay							daysdays	
		month da,							daysdays	0 0 0 0 0 0
		/ month/day			0				days days	
	Ì	month, day							days days	0 0 0 0 0 0
		month lay			0				days days	0 0 1 0 0
				Page totals	1		1		1	
Public reporting burden for this collection of information is estimated to average 14 minutes per response, including time to review the instructions, search and gather the clear needed, and complete and review the collection of information. Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number. If you have any comments about these estimates or any other aspects of this data collection, contact: US Department of Labor, OSHA, Office of Statistical	ormation is estimated to a led, and complete and rev s it displays a currently va data collection, contact: t	verage 14 minutes pe tiew the collection of i lid OMB control nut JS Department of Lal	r response, including time to review information. Persons are not required ther. If you have any comments bor, OSHA Office of Statistical	Be sure to transfer these totals to the Summary page (Form 300A) before you post it.	these totals to	the Summary	uage (Form 30	OA) befare you pos	tit.	Injury kin disorder Respiratory condition Poisoning Hearing to
Athalysis, Room N-3614, 200 Constitution Avenue, NW, Washington, DC 20210. Do not send the completed forms to this office.	e, NW, Washington, DC 2	0010								

OSHA's Form 300A (Rev. 01/2004)

Summary of Work-Related Injuries and Illnesses

Year 20

U.S. Department of Labor Occupational Safety and Health Administration

Form approved OMB no. 1218-0176

to verify that the entries are complete and accurate before completing this summary. All establishments covered by Part 1904 must complete this Summary page, even if no work-related injuries or illnesses occurred during the year. Remember to review the Log

Using the Log, count the individual entries you made for each category. Then write the totals below, making sure you've added the entries from every page of the Log. If you

Employess, former employees, and their representatives have the right to review the OSHA Form 300 in its entirety. They also have limited access to the OSHA Form 301 or its equivalent. See 29 CFR Part 1904.35, in OSHA's recordkeeping rule, for further details on the access provisions for these forms.

Number of Cases	ases		
Total number of deaths	Total number of cases with days away from work	Total number of cases with job transfer or restriction	Total number of other recordable cases
(G)	(H)	0)	(1)
Number of Days	ays		
Total number of days away from work	ys away	Total number of days of job transfer or restriction	
(X)		(L)	
Injury and Illness Types	ness Types		
Total number of (M) (1) Injuries		(4) Poisonings	
(2) Skin disorders (3) Respiratory conditions	ons	(5) Hearing loss (6) All other illnesses	

Post this Summary page from February 1 to April 30 of the year following the year covered by the form.

Public reporting burden for this collection of information is estimated to average 58 minutes per response, including time to review the instructions, search and gather the data needed, and complete and review the collection of information. Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number. If you have any comments about these estimates or any other aspects of this data collection, contact: US Department of Labor, OSHA Office of Statistical Analysis, Room N-3644, 200 Constitution Avenue, NW, Washington, DC 20210. Do not send the completed forms to this office.

Your establishment name	
Street	State ZIP
Industry description (e.g., Manufacture of motor truck trailers)	uck trailers)
Standard Industrial Classification (SIC), if known (e.g., 3715)	wn (e.g., 3715)
OR	
North American Industrial Classification (NAICS), if known (e.g., 336212)	CS), if known (e.g., 336212)
Employment information (If you don't have these figures, see the Workshoet on the back of this page to estimate.)	i't have these figures, see the
Annual average number of employees	
Total hours worked by all employees last year	
Sign here	
sign here Ωnowingly falsifying this document π	ay result in a fine.
Sign here Inowingly falsifying this document receify that I have examined this document in the control of the	ay result in a fine.
Sign here Inowingly falsifying this document manual certify that I have examined this document mowledge the entries are true, accurate, a	ay result in a fine. nt and that to the best of my and complete.
Sign here Knowingly falsifying this document may result in a fine. Certify that I have examined this document and that to the best of my knowledge the entries are true, accurate, and complete. Take	nay result in a fine. In and that to the best of my d complete.

ATTACHMENT 5 SIGNATORY PAGE

Attachment 4 – Site-Specific Health and Safety Orientation Signatory Page HEALTH AND SAFETY PLAN

Title	Name	Signature
Project Manager:	TBD	
Health and Safety Manager:	TBD	

I have read the attached Health and Safety Plan (HASP) and have received site-specific information and orientation regarding the identified physical, chemical, and biological hazards anticipated at this site. My signature certifies that I understand the procedures, equipment, and restrictions applicable to this project site and agree to abide by them.

Signature	Printed Name	Company	Date

Attachment 4 – Health and Safety Orientation Signatory Page (continued)

Signature	Printed Name	Company	Date
	Health and Safety Orientatio	n Cianatany Daga	

Health and Safety Orientation Signatory Page
(2 of 2)

ATTACHMENT 6 SAFETY DATA SHEETS

Page 1 of 8

SAFETY DATA SHEET

Version 5.5 Revision Date 06/13/2014 Print Date 10/19/2018

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

CAS-No.

Product name : 4.4′-DDD

Product Number : 49009
Brand : Supelco

1.2 Relevant identified uses of the substance or mixture and uses advised against

72-54-8

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich

3050 Spruce Street SAINT LOUIS MO 63103

USA

Telephone : +1 800-325-5832 Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 3), H301 Acute toxicity, Dermal (Category 4), H312 Carcinogenicity (Category 2), H351 Acute aquatic toxicity (Category 1), H400 Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H301 Toxic if swallowed.

H312 Harmful in contact with skin.
H351 Suspected of causing cancer.

H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201 Obtain special instructions before use.

P202 Do not handle until all safety precautions have been read and

understood.

P264 Wash skin thoroughly after handling.

P270 Do not eat, drink or smoke when using this product.

Supelco - 49009

P273 Avoid release to the environment.

P280 Wear protective gloves/ protective clothing.

P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/

physician

P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.

P322 Specific measures (see supplemental first aid instructions on this label).

P330 Rinse mouth.

P363 Wash contaminated clothing before reuse.

P391 Collect spillage. P405 Store locked up.

P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : 1,1-Dichloro-2,2-bis(4-chlorophenyl)ethane

Formula : C₁₄H₁₀Cl₄

Molecular Weight : 320.04 g/mol
CAS-No. : 72-54-8

EC-No. : 200-783-0

Hazardous components

Component	Classification	Concentration
2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane		
	Acute Tox. 3; Acute Tox. 4;	-
	Carc. 2; Aquatic Acute 1;	
	Aquatic Chronic 1; H301,	
	H312, H351, H410	

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

no data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Supelco - 49009 Page 2 of 8

5.2 Special hazards arising from the substance or mixture

Carbon oxides, Hydrogen chloride gas

Nature of decomposition products not known.

5.3 Advice for firefighters

Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information

no data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eves. Avoid formation of dust and aerosols.

Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection. For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

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Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Form: solid a) Appearance

b) Odour no data available c) Odour Threshold no data available d) рН no data available

94.0 - 96.0 °C (201.2 - 204.8 °F) e) Melting point/freezing

point

Initial boiling point and 193.0 °C (379.4 °F) at 1.3 hPa (1.0 mmHg)

boiling range

g) Flash point no data available h) Evapouration rate no data available Flammability (solid, gas) no data available

Upper/lower no data available

flammability or explosive limits

k) Vapour pressure < 0.00001 hPa (< 0.00001 mmHg) at 25.0 °C (77.0 °F)

Vapour density no data available

m) Relative density 1.38 g/cm3

n) Water solubility no data available log Pow: 6.02

o) Partition coefficient: noctanol/water

no data available

p) Auto-ignition temperature

no data available

g) Decomposition temperature

r) Viscosity no data available no data available s) Explosive properties 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

Supelco - 49009 Page 4 of 8

10.4 Conditions to avoid

no data available

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - no data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Hamster - > 5,000 mg/kg

TDLo Oral - Human - 428.5 mg/kg

Remarks: Endocrine: Adrenal cortex hypoplasia.

TDLo Oral - rat - 6,000 mg/kg

Remarks: Cardiac:Other changes. Gastrointestinal:Other changes. Kidney, Ureter, Bladder:Changes in both tubules and glomeruli.

TDLo Oral - rat - 14 mg/kg

Remarks: Liver:Changes in liver weight. Endocrine:Estrogenic. Musculoskeletal:Other changes.

TDLo Oral - rat - 2,100 mg/kg

Remarks: Behavioral: Altered sleep time (including change in righting reflex).

Inhalation: no data available

LD50 Dermal - rabbit - 1,200 mg/kg

Remarks: Behavioral:Excitement, Behavioral:Convulsions or effect on seizure threshold, Skin irritation

no data available

Skin corrosion/irritation

no data available

Serious eye damage/eye irritation

no data available

Respiratory or skin sensitisation

no data available

no data available

Germ cell mutagenicity

no data available

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Limited evidence of carcinogenicity in animal studies

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as

probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a

carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a

known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a

carcinogen or potential carcinogen by OSHA.

Supelco - 49009 Page 5 of 8

Reproductive toxicity

no data available

no data available

Specific target organ toxicity - single exposure

no data available

Specific target organ toxicity - repeated exposure

no data available

Aspiration hazard

no data available

Additional Information

RTECS: KI0700000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish LC50 - other fish - 1.18 - 9 mg/l - 96.0 h

LC50 - Lepomis macrochirus (Bluegill) - 0.04 - 0.05 mg/l - 96.0 h

LC50 - Oncorhynchus mykiss (rainbow trout) - 0.06 - 0.09 mg/l $\,$ - 96.0 h

LC50 - Pimephales promelas (fathead minnow) - 3.47 - 5.58 mg/l - 96.0 h

Toxicity to daphnia and

other aquatic invertebrates

EC50 - Daphnia pulex (Water flea) - 0.01 mg/l - 48 h

12.2 Persistence and degradability

no data available

12.3 Bioaccumulative potential

Indication of bioaccumulation.

12.4 Mobility in soil

no data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Very toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 2811 Class: 6.1 Packing group: III

Proper shipping name: Toxic solids, organic, n.o.s. (2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane)

Marine pollutant: No

Supelco - 49009 Page 6 of 8

Poison Inhalation Hazard: No

IMDG

UN number: 2811 Class: 6.1 Packing group: III EMS-No: F-A, S-A Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. (2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane)

Marine pollutant: No

IATA

UN number: 2811 Class: 6.1 Packing group: III

Proper shipping name: Toxic solid, organic, n.o.s. (2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane)

15. REGULATORY INFORMATION

SARA 302 Components

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Acute Health Hazard

Massachusetts Right To Know Components

No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

CAS-No. Revision Date 2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane 72-54-8 1993-04-24

New Jersey Right To Know Components

CAS-No. Revision Date 72-54-8 1993-04-24

2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox. Acute toxicity

Aquatic Acute Acute aquatic toxicity
Aquatic Chronic Chronic aquatic toxicity

Carc. Carcinogenicity
H301 Toxic if swallowed.

H312 Harmful in contact with skin.
H351 Suspected of causing cancer.
H400 Very toxic to aquatic life.

H410 Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard: 2
Chronic Health Hazard: *
Flammability: 0
Physical Hazard 0

NFPA Rating

Health hazard: 2
Fire Hazard: 0
Reactivity Hazard: 0

Supelco - 49009 Page 7 of 8

Further information

Copyright 2014 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 and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation Product Safety – Americas Region 1-800-521-8956

Version: 5.5 Revision Date: 06/13/2014 Print Date: 10/19/2018

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SAFETY DATA SHEET

Version 5.6 Revision Date 05/07/2018 Print Date 06/22/2019

1. PRODUCT AND COMPANY IDENTIFICATION

Product identifiers

Product name 4,4'-DDT

Product Number 386340 Brand Aldrich Index-No. 602-045-00-7

CAS-No. 50-29-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

> Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

> Company Sigma-Aldrich

3050 Spruce Street

SAINT LOUIS MO 63103

USA

Telephone +1 800-325-5832 +1 800-325-5052 Fax

1.4 **Emergency telephone number**

> Emergency Phone # +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 3), H301 Acute toxicity, Dermal (Category 3), H311 Carcinogenicity (Category 2), H351

Specific target organ toxicity - repeated exposure, Oral (Category 1), H372

Acute aquatic toxicity (Category 1), H400 Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)

H301 + H311 Toxic if swallowed or in contact with skin.

H351 Suspected of causing cancer.

H372 Causes damage to organs through prolonged or repeated exposure if

swallowed.

H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201 Obtain special instructions before use.

P202 Do not handle until all safety precautions have been read and understood.

P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.

P264 Wash skin thoroughly after handling.

P270 Do not eat, drink or smoke when using this product.

P273 Avoid release to the environment.

P280 Wear protective gloves/ protective clothing.
P281 Use personal protective equipment as required.

P301 + P310 + P330 IF SWALLOWED: Immediately call a POISON CENTER/doctor. Rinse

mouth.

P302 + P352 + P312 IF ON SKIN: Wash with plenty of soap and water. Call a POISON

CENTER or doctor/ physician if you feel unwell.

P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P361 Remove/Take off immediately all contaminated clothing.

P363 Wash contaminated clothing before reuse.

P391 Collect spillage. P405 Store locked up.

P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms: 1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane

1,1-Bis(4-chlorophenyl)-2,2,2-trichloroethane

Formula : C₁₄H₉Cl₅

Molecular weight : 354.49 g/mol
CAS-No. : 50-29-3
EC-No. : 200-024-3
Index-No. : 602-045-00-7

Hazardous components

Component	Classification	Concentration
1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane		
	Acute Tox. 3; Carc. 2; STOT	90 - 100 %
	RE 1; Aquatic Acute 1; Aquatic	
	Chronic 1; H301 + H311,	
	H351, H372, H410	

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

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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

Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.

Provide appropriate exhaust ventilation at places where dust is formed.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Storage class (TRGS 510): 6.1D: Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

- Componente man m						
Component	CAS-No.	Value	Control parameters	Basis		
1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	50-29-3	TWA	1 mg/m3	USA. ACGIH Threshold Limit Values (TLV)		
	Remarks	Liver damage Confirmed a		vith unknown relevance to humans		

TWA	0.5 mg/m3	USA. NIOSH Recommended Exposure Limits	
	Potential Occupational Carcinogen See Appendix A		
TWA	1 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants	
Skin design	Skin designation		
PEL	1 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)	
Skin			

8.2 Exposure controls

Appropriate engineering controls

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: FN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance Form: solid

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b) Odourc) Odour Thresholdd) pHNo data availableNo data available

e) Melting point/freezing

point

Melting point/range: 107 - 110 °C (225 - 230 °F) - lit.

f) Initial boiling point and

boiling range

260.0 °C (500.0 °F)

g) Flash point 72.0 - 77.0 °C (161.6 - 170.6 °F)

h) Evaporation rate No data availablei) Flammability (solid, gas) No data availablej) Upper/lower No data available

flammability or explosive limits

k) Vapour pressure 0.0000021 hPa (0.0000016 mmHg) at 20.0 °C (68.0 °F)

I) Vapour density No data available

m) Relative density 0.99 g/cm3

n) Water solubility No data available
 o) Partition coefficient: n- log Pow: 6.91 octanol/water

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, Iron and iron salts.

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas Other decomposition products - No data available In the event of fire: see section 5

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11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 87.0 mg/kg Inhalation: No data available

LD50 Dermal - Rabbit - 300.0 mg/kg

Remarks: Behavioral:Tremor. Behavioral:Muscle weakness. Behavioral:Ataxia.

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

Limited evidence of carcinogenicity in animal studies

IARC: 2A - Group 2A: Probably carcinogenic to humans (1,1,1-Trichloro-2,2-bis(4-

chlorophenyl)ethane)

IARC: 2A - Group 2A: Probably carcinogenic to humans (1,1,1-Trichloro-2,2-bis(4-

chlorophenyl)ethane)

NTP: RAHC - Reasonably anticipated to be a human carcinogen (1,1,1-Trichloro-2,2-bis(4-

chlorophenyl)ethane)

NTP: RAHC - Reasonably anticipated to be a human carcinogen (1,1,1-Trichloro-2,2-bis(4-

chlorophenyl)ethane)

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's

list of regulated carcinogens.

No component of this product present at levels greater than or equal to 0.1% is on OSHA's

list of regulated carcinogens.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

Ingestion - Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard

No data available

Additional Information

RTECS: KJ3325000

CNS stimulation.

Pancreas. -

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12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish LC50 - Pimephales promelas (fathead minnow) - 0.01 mg/l - 96.0 h

LC50 - Lepomis macrochirus (Bluegill) - 0.01 mg/l - 96.0 h

LC50 - Oncorhynchus mykiss (rainbow trout) - 0.003400 mg/l - 96.0 h

LOEC - Oncorhynchus mykiss (rainbow trout) - 150 mg/l - 3.0 d

NOEC - Oncorhynchus mykiss (rainbow trout) - 113 mg/l - 3.0 d

Toxicity to daphnia and

other aquatic invertebrates

Immobilization EC50 - Daphnia magna (Water flea) - 0.00108 mg/l - 48 h

Toxicity to algae LC100 - Scenedesmus quadricauda (Green algae) - > 20 mg/l - 7 d

12.2 Persistence and degradability

12.3 Bioaccumulative potential

Bioaccumulation Oncorhynchus mykiss (rainbow trout) - 20 d

- 0.001 mg/l

Bioconcentration factor (BCF): 46,670

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 2811 Class: 6.1 Packing group: III

Proper shipping name: Toxic solids, organic, n.o.s. (1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane)

Reportable Quantity (RQ): 1 lbsMarine pollutant:yes

Poison Inhalation Hazard: No

IMDG

UN number: 2811 Class: 6.1 Packing group: III EMS-No: F-A, S-A Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. (1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane)

Marine pollutant:yes

IATA

UN number: 2811 Class: 6.1 Packing group: III

Proper shipping name: Toxic solid, organic, n.o.s. (1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane)

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15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components		
1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	CAS-No. 50-29-3	Revision Date 1993-02-16
1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	CAS-No. 50-29-3	Revision Date 1993-02-16
Pennsylvania Right To Know Components	CAC N-	Davida Data
1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	CAS-No. 50-29-3	Revision Date 1993-02-16
1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	CAS-No. 50-29-3	Revision Date 1993-02-16
1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	CAS-No. 50-29-3	Revision Date 1993-02-16
New Jersey Right To Know Components		
1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	CAS-No. 50-29-3	Revision Date 1993-02-16
1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	CAS-No. 50-29-3	Revision Date 1993-02-16
California Prop. 65 Components WARNING! This product contains a chemical known to the State of California to cause cancer. 1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	CAS-No. 50-29-3	Revision Date 2008-06-17
WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. 1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	CAS-No. 50-29-3	Revision Date 2008-06-17
WARNING! This product contains a chemical known to the State of California to cause cancer. 1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	CAS-No. 50-29-3	Revision Date 2008-06-17
WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. 1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	CAS-No. 50-29-3	Revision Date 2008-06-17

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

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Acute Tox. Acute toxicity

Aquatic Acute Acute aquatic toxicity
Aquatic Chronic Chronic aquatic toxicity

Carc. Carcinogenicity
H301 Toxic if swallowed.

H301 + H311 Toxic if swallowed or in contact with skin.

H311 Toxic in contact with skin.
H351 Suspected of causing cancer.

H372 Causes damage to organs through prolonged or repeated exposure if swallowed.

HMIS Rating

Health hazard: 2
Chronic Health Hazard: *
Flammability: 0
Physical Hazard 0

NFPA Rating

Health hazard: 2
Fire Hazard: 2
Reactivity Hazard: 0

Further information

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Preparation Information

Sigma-Aldrich Corporation Product Safety – Americas Region 1-800-521-8956

Version: 5.6 Revision Date: 05/07/2018 Print Date: 06/22/2019

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SAFETY DATA SHEET

Version 5.6 Revision Date 05/07/2018 Print Date 06/22/2019

1. PRODUCT AND COMPANY IDENTIFICATION

Product identifiers

Product name 4,4'-DDT

Product Number 386340 Brand Aldrich Index-No. 602-045-00-7

CAS-No. 50-29-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

> Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

> Company Sigma-Aldrich

3050 Spruce Street

SAINT LOUIS MO 63103

USA

Telephone +1 800-325-5832 +1 800-325-5052 Fax

1.4 **Emergency telephone number**

> Emergency Phone # +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 3), H301 Acute toxicity, Dermal (Category 3), H311 Carcinogenicity (Category 2), H351

Specific target organ toxicity - repeated exposure, Oral (Category 1), H372

Acute aquatic toxicity (Category 1), H400 Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)

H301 + H311 Toxic if swallowed or in contact with skin.

H351 Suspected of causing cancer.

H372 Causes damage to organs through prolonged or repeated exposure if

swallowed.

H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201 Obtain special instructions before use.

P202 Do not handle until all safety precautions have been read and understood.

P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.

P264 Wash skin thoroughly after handling.

P270 Do not eat, drink or smoke when using this product.

P273 Avoid release to the environment.

P280 Wear protective gloves/ protective clothing.
P281 Use personal protective equipment as required.

P301 + P310 + P330 IF SWALLOWED: Immediately call a POISON CENTER/doctor. Rinse

mouth.

P302 + P352 + P312 IF ON SKIN: Wash with plenty of soap and water. Call a POISON

CENTER or doctor/ physician if you feel unwell.

P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P361 Remove/Take off immediately all contaminated clothing.

P363 Wash contaminated clothing before reuse.

P391 Collect spillage. P405 Store locked up.

P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms: 1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane

1,1-Bis(4-chlorophenyl)-2,2,2-trichloroethane

Formula : C₁₄H₉Cl₅

Molecular weight : 354.49 g/mol
CAS-No. : 50-29-3
EC-No. : 200-024-3
Index-No. : 602-045-00-7

Hazardous components

Component	Classification	Concentration
1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane		
	Acute Tox. 3; Carc. 2; STOT	90 - 100 %
	RE 1; Aquatic Acute 1; Aquatic	
	Chronic 1; H301 + H311,	
	H351, H372, H410	

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

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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

Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.

Provide appropriate exhaust ventilation at places where dust is formed.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Storage class (TRGS 510): 6.1D: Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

componente mui montpiaco control parametero					
Component	CAS-No.	Value	Control parameters	Basis	
1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	50-29-3	TWA	1 mg/m3	USA. ACGIH Threshold Limit Values (TLV)	
	Remarks	Liver damage Confirmed animal carcinogen with unknown relevance to humans			

TWA	0.5 mg/m3	USA. NIOSH Recommended Exposure Limits	
	Potential Occupational Carcinogen See Appendix A		
TWA	1 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants	
Skin design	Skin designation		
PEL	1 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)	
Skin			

8.2 Exposure controls

Appropriate engineering controls

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: FN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance Form: solid

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b) Odourc) Odour Thresholdd) pHNo data availableNo data available

e) Melting point/freezing

point

Melting point/range: 107 - 110 °C (225 - 230 °F) - lit.

f) Initial boiling point and

boiling range

260.0 °C (500.0 °F)

g) Flash point 72.0 - 77.0 °C (161.6 - 170.6 °F)

h) Evaporation rate No data availablei) Flammability (solid, gas) No data availablej) Upper/lower No data available

flammability or explosive limits

k) Vapour pressure 0.0000021 hPa (0.0000016 mmHg) at 20.0 °C (68.0 °F)

I) Vapour density No data available

m) Relative density 0.99 g/cm3

n) Water solubility No data available
 o) Partition coefficient: n- log Pow: 6.91 octanol/water

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, Iron and iron salts.

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas Other decomposition products - No data available In the event of fire: see section 5

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11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 87.0 mg/kg Inhalation: No data available

LD50 Dermal - Rabbit - 300.0 mg/kg

Remarks: Behavioral:Tremor. Behavioral:Muscle weakness. Behavioral:Ataxia.

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

Limited evidence of carcinogenicity in animal studies

IARC: 2A - Group 2A: Probably carcinogenic to humans (1,1,1-Trichloro-2,2-bis(4-

chlorophenyl)ethane)

IARC: 2A - Group 2A: Probably carcinogenic to humans (1,1,1-Trichloro-2,2-bis(4-

chlorophenyl)ethane)

NTP: RAHC - Reasonably anticipated to be a human carcinogen (1,1,1-Trichloro-2,2-bis(4-

chlorophenyl)ethane)

NTP: RAHC - Reasonably anticipated to be a human carcinogen (1,1,1-Trichloro-2,2-bis(4-

chlorophenyl)ethane)

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's

list of regulated carcinogens.

No component of this product present at levels greater than or equal to 0.1% is on OSHA's

list of regulated carcinogens.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

Ingestion - Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard

No data available

Additional Information

RTECS: KJ3325000

CNS stimulation.

Pancreas. -

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12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish LC50 - Pimephales promelas (fathead minnow) - 0.01 mg/l - 96.0 h

LC50 - Lepomis macrochirus (Bluegill) - 0.01 mg/l - 96.0 h

LC50 - Oncorhynchus mykiss (rainbow trout) - 0.003400 mg/l - 96.0 h

LOEC - Oncorhynchus mykiss (rainbow trout) - 150 mg/l - 3.0 d

NOEC - Oncorhynchus mykiss (rainbow trout) - 113 mg/l - 3.0 d

Toxicity to daphnia and

other aquatic invertebrates

Immobilization EC50 - Daphnia magna (Water flea) - 0.00108 mg/l - 48 h

Toxicity to algae LC100 - Scenedesmus quadricauda (Green algae) - > 20 mg/l - 7 d

12.2 Persistence and degradability

12.3 Bioaccumulative potential

Bioaccumulation Oncorhynchus mykiss (rainbow trout) - 20 d

- 0.001 mg/l

Bioconcentration factor (BCF): 46,670

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 2811 Class: 6.1 Packing group: III

Proper shipping name: Toxic solids, organic, n.o.s. (1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane)

Reportable Quantity (RQ): 1 lbsMarine pollutant:yes

Poison Inhalation Hazard: No

IMDG

UN number: 2811 Class: 6.1 Packing group: III EMS-No: F-A, S-A Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. (1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane)

Marine pollutant:yes

IATA

UN number: 2811 Class: 6.1 Packing group: III

Proper shipping name: Toxic solid, organic, n.o.s. (1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane)

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15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components		
1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	CAS-No. 50-29-3	Revision Date 1993-02-16
1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	CAS-No. 50-29-3	Revision Date 1993-02-16
Pennsylvania Right To Know Components	0.4.0.1.1	D D (
1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	CAS-No. 50-29-3	Revision Date 1993-02-16
1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	CAS-No. 50-29-3	Revision Date 1993-02-16
1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	CAS-No. 50-29-3	Revision Date 1993-02-16
New Jersey Right To Know Components		
1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	CAS-No. 50-29-3	Revision Date 1993-02-16
1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	CAS-No. 50-29-3	Revision Date 1993-02-16
California Prop. 65 Components WARNING! This product contains a chemical known to the State of California to cause cancer. 1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	CAS-No. 50-29-3	Revision Date 2008-06-17
WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. 1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	CAS-No. 50-29-3	Revision Date 2008-06-17
WARNING! This product contains a chemical known to the State of California to cause cancer. 1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	CAS-No. 50-29-3	Revision Date 2008-06-17
WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. 1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	CAS-No. 50-29-3	Revision Date 2008-06-17

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

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Acute Tox. Acute toxicity

Aquatic Acute Acute aquatic toxicity
Aquatic Chronic Chronic aquatic toxicity

Carc. Carcinogenicity
H301 Toxic if swallowed.

H301 + H311 Toxic if swallowed or in contact with skin.

H311 Toxic in contact with skin.
H351 Suspected of causing cancer.

H372 Causes damage to organs through prolonged or repeated exposure if swallowed.

HMIS Rating

Health hazard: 2
Chronic Health Hazard: *
Flammability: 0
Physical Hazard 0

NFPA Rating

Health hazard: 2
Fire Hazard: 2
Reactivity Hazard: 0

Further information

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Preparation Information

Sigma-Aldrich Corporation Product Safety – Americas Region 1-800-521-8956

Version: 5.6 Revision Date: 05/07/2018 Print Date: 06/22/2019

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SAFETY DATA SHEET

Version 6.1 Revision Date 05/28/2017 Print Date 06/29/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Acetone

Product Number : 650501 Brand : SIGALD Index-No. : 606-001-00-8

CAS-No. : 67-64-1

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.

3050 Spruce Street ST. LOUIS MO 63103 UNITED STATES

Telephone : +1 314 771-5765 Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquids (Category 2), H225 Eye irritation (Category 2A), H319

Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)

H225
 H319
 H336
 Highly flammable liquid and vapour.
 Causes serious eye irritation.
 May cause drowsiness or dizziness.

Precautionary statement(s)

P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.

P233 Keep container tightly closed.

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P240 Ground/bond container and receiving equipment. P241 Use explosion-proof electrical/ ventilating/ lighting/ equipment. P242 Use only non-sparking tools. Take precautionary measures against static discharge. P243 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray. P261 Wash skin thoroughly after handling. P264 Use only outdoors or in a well-ventilated area. P271 Wear protective gloves/ eye protection/ face protection. P280 IF ON SKIN (or hair): Take off immediately all contaminated clothing. P303 + P361 + P353 Rinse skin with water/shower. P304 + P340 + P312 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell. P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/ attention. P337 + P313 P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to Store in a well-ventilated place. Keep container tightly closed. P403 + P233 Store in a well-ventilated place. Keep cool. P403 + P235 Store locked up. P405 P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Repeated exposure may cause skin dryness or cracking.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula : C₃H₆O

Molecular weight : 58.08 g/mol

CAS-No. : 67-64-1

EC-No. : 200-662-2

Index-No. : 606-001-00-8

Hazardous components

Component	Classification	Concentration
Acetone		
	Flam. Liq. 2; Eye Irrit. 2A; STOT SE 3; H225, H319, H336	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

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4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

Use explosion-proof equipment. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

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

Derived No Effect Level (DNEL)

Donivou no Enoue E	····		
Application Area	Exposure routes	Health effect	Value
Workers	Skin contact	Long-term systemic effects	186mg/kg BW/d
Consumers	Ingestion	Long-term systemic effects	62mg/kg BW/d
Consumers	Skin contact	Long-term systemic effects	62mg/kg BW/d
Workers	Inhalation	Acute systemic effects	2420 mg/m3
Workers	Inhalation	Long-term systemic effects	1210 mg/m3

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Consumers	Inhalation	Long-term sy	stemic effects	200 mg/m3
Predicted No Ef	Predicted No Effect Concentration (PNEC)			
Compartment			Value	
Soil			33.3 mg/kg	
Marine water			1.06 mg/l	
Fresh water			10.6 mg/l	
Marine sediment			3.04 mg/kg	
Fresh water sedi	ment		30.4 mg/kg	
Onsite sewage tr	eatment plant		100 mg/l	

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: butyl-rubber

Minimum layer thickness: 0.3 mm Break through time: 480 min

Material tested:Butoject® (KCL 897 / Aldrich Z677647, Size M)

Splash contact Material: butyl-rubber

Minimum layer thickness: 0.3 mm Break through time: 480 min

Material tested:Butoject® (KCL 897 / Aldrich Z677647, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method:

EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industria situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Impervious clothing, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engine protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance Form: liquid, clear Colour: colourless

b) Odourc) Odour Thresholddata availableNo data available

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d) pH No data available

e) Melting point/freezing Melting point/range: -94 °C (-137 °F)

point

f) Initial boiling point and 56 °C (133 °F) at 1013 hPa

boiling range

g) Flash point -17.0 °C (1.4 °F) - closed cup

h) Evaporation rate No data availablei) Flammability (solid, gas) No data available

j) Upper/lower Upper explosion limit: 13 %(V) flammability or Lower explosion limit: 2 %(V)

explosive limits

k) Vapour pressure 533.3 hPa at 39.5 °C (103.1 °F)

245.3 hPa at 20.0 °C(68.0 °F)

I) Vapour density No data available

m) Relative density 0.791 g/mL at 25 °C (77 °F)

n) Water solubility completely miscible

o) Partition coefficient: noctanol/water

- log Pow: -0.24

p) Auto-ignition 465.0 °C (869.0 °F) temperature

q) Decomposition temperature

No data available

r) Viscosity No data available
 s) Explosive properties No data available
 t) Oxidizing properties No data available

9.2 Other safety information

Surface tension 23.2 mN/m at 20.0 °C (68.0 °F)

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

Vapours may form explosive mixture with air.

10.4 Conditions to avoid

Heat, flames and sparks.

10.5 Incompatible materials

Bases, Oxidizing agents, Reducing agents, Acetone reacts violently with phosphorous oxychloride.

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

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11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 5,800 mg/kg(Acetone)

Remarks: Behavioral:Altered sleep time (including change in righting reflex). Behavioral:Tremor. Behavioral:Headache. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhoea.

LC50 Inhalation - Rat - 8 h - 50,100 mg/m3(Acetone) Remarks: Drowsiness Dizziness Unconsciousness LD50 Dermal - Guinea pig - 7,426 mg/kg(Acetone)

No data available(Acetone)

Skin corrosion/irritation

Skin - Rabbit(Acetone)

Result: Mild skin irritation - 24 h

Serious eye damage/eye irritation

Eyes - Rabbit(Acetone) Result: Eye irritation - 24 h

Respiratory or skin sensitisation

- Guinea pig(Acetone)

Result: Does not cause skin sensitisation.

Germ cell mutagenicity

No data available(Acetone)

Carcinogenicity

This product is or contains a component that is not classifiable as to its classification.(Acetone) (Acetone)

(Acetone)

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as

probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a

known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a

carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available(Acetone)

No data available(Acetone)

Specific target organ toxicity - single exposure

May cause drowsiness or dizziness.(Acetone)

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available(Acetone)

Additional Information

RTECS: AL3150000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.(Acetone)

Kidney - Irregularities - Based on Human Evidence

Skin - Dermatitis - Based on Human Evidence

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12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish LC50 - Oncorhynchus mykiss (rainbow trout) - 5,540 mg/l - 96 h(Acetone)

Toxicity to daphnia and

LC50 - Daphnia magna (Water flea) - 8,800 mg/l - 48 h(Acetone)

other aquatic invertebrates

Toxicity to algae Remarks: No data available

12.2 Persistence and degradability

Biodegradability Result: 91 % - Readily biodegradable.

(OECD Test Guideline 301B)

12.3 Bioaccumulative potential

Does not bioaccumulate.

12.4 Mobility in soil

No data available(Acetone)

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber b highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1090 Class: 3 Packing group: II

Proper shipping name: Acetone

Reportable Quantity (RQ) : 5000 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 1090 Class: 3 Packing group: II EMS-No: F-E, S-D

Proper shipping name: ACETONE

IATA

UN number: 1090 Class: 3 Packing group: II

Proper shipping name: Acetone

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15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

CAS-No. Revision Date

Acetone 67-64-1

Pennsylvania Right To Know Components

CAS-No. Revision Date

Acetone 67-64-1

New Jersey Right To Know Components

CAS-No. Revision Date

Acetone 67-64-1

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

H225 Highly flammable liquid and vapour. H319 Causes serious eye irritation.

H336 May cause drowsiness or dizziness.

HMIS Rating

Health hazard: 2
Chronic Health Hazard: *
Flammability: 3
Physical Hazard 0

NFPA Rating

Health hazard: 2
Fire Hazard: 3
Reactivity Hazard: 0

Further information

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Preparation Information

Sigma-Aldrich Corporation Product Safety – Americas Region 1-800-521-8956

Version: 6.1 Revision Date: 05/28/2017 Print Date: 06/29/2019

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SAFETY DATA SHEET

Version 4.9 Revision Date 01/06/2018 Print Date 11/10/2018

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Aldrin

Product Number : 49000-U
Brand : Supelco
Index-No. : 602-048-00-3

CAS-No. : 309-00-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich

3050 Spruce Street

SAINT LOUIS MO 63103

USA

Telephone : +1 800-325-5832 Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +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 2), H300 Acute toxicity, Dermal (Category 1), H310

Carcinogenicity (Category 2), H351

Specific target organ toxicity - repeated exposure (Category 1), H372

Acute aquatic toxicity (Category 1), H400 Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)

H300 + H310 Fatal if swallowed or in contact with skin.

H351 Suspected of causing cancer.

H372 Causes damage to organs through prolonged or repeated exposure.

H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201 Obtain special instructions before use.

P202 Do not handle until all safety precautions have been read and

understood.

P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray. Do not get in eyes, on skin, or on clothing. P262 P264 Wash skin thoroughly after handling. Do not eat, drink or smoke when using this product. P270 Avoid release to the environment. P273 P280 Wear protective gloves/ protective clothing/ eye protection/ face protection. IF SWALLOWED: Immediately call a POISON CENTER/doctor. Rinse P301 + P310 + P330 mouth. IF ON SKIN: Gently wash with plenty of soap and water. Immediately call P302 + P350 + P310 a POISON CENTER or doctor/ physician. P308 + P313 IF exposed or concerned: Get medical advice/ attention. Take off contaminated clothing and wash before reuse. P362 P391 Collect spillage. P405 Store locked up. P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula : C₁₂H₈Cl₆

Molecular weight : 364.91 g/mol
CAS-No. : 309-00-2

EC-No. : 206-215-8
Index-No. : 602-048-00-3

Hazardous components

Component	Classification	Concentration
Aldrin		
	Acute Tox. 2; Acute Tox. 1; Carc. 2; STOT RE 1; Aquatic Acute 1; Aquatic Chronic 1; H300 + H310, H351, H372, H410	90 - 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

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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

Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.

Provide appropriate exhaust ventilation at places where dust is formed.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Store at room temperature.

Storage class (TRGS 510): 6.1B: Non-combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

- Componente man n	ornpiace come	p a	. •	
Component	CAS-No.	Value	Control	Basis
			parameters	
Aldrin	309-00-2	TWA	0.050000	USA. ACGIH Threshold Limit Values
			mg/m3	(TLV)
	Remarks	Central Nerv	ous System impai	rment
		Liver damag	е	
		Kidney dama	age	
		Confirmed a	nimal carcinogen v	vith unknown relevance to humans

Danger of	f cutaneous absorpt	tion
TWA	0.250000	USA. NIOSH Recommended
	mg/m3	Exposure Limits
Potential (Occupational Carci	nogen
See Appe		
Potential t	for dermal absorption	on
TWA	0.250000	USA. Occupational Exposure Limits
	mg/m3	(OSHA) - Table Z-1 Limits for Air
		Contaminants
Skin desiç		
TWA	0.05 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
Liver dam Kidney da	amage	
	d animal carcinoger f cutaneous absorpt	n with unknown relevance to humans tion
TWA	0.25 mg/m3	USA. NIOSH Recommended Exposure Limits
See Appe	Occupational Carcilendix A for dermal absorption	-
TWA	0.25 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
Skin desig	gnation	
PEL	0.25 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
Skin		·

8.2 Exposure controls

Appropriate engineering controls

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

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Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Form: solid a) Appearance

Colour: colourless

b) Odour No data available Odour Threshold No data available No data available d) рΗ

e) Melting point/freezing

point

96.0 - 98.0 °C (204.8 - 208.4 °F)

Initial boiling point and boiling range

No data available

g) Flash point No data available No data available h) Evaporation rate Flammability (solid, gas) No data available

Upper/lower flammability or explosive limits No data available

No data available k) Vapour pressure Vapour density No data available

m) Relative density 1.60 g/cm3 at 20.00 °C (68.00 °F)

n) Water solubility insoluble o) Partition coefficient: nlog Pow: 6.50 octanol/water

p) Auto-ignition temperature

No data available

q) Decomposition temperature

No data available

No data available Viscosity r) s) Explosive properties No data available No data available Oxidizing properties

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

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10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 39.0 mg/kg

Inhalation: No data available

LD50 Dermal - Rabbit - 15.0 mg/kg

Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and Taste):Olfaction:Other changes.

Behavioral: Convulsions or effect on seizure threshold. Behavioral: Excitement.

No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Limited evidence of carcinogenicity in animal studies

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as

probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a

known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's

list of regulated carcinogens.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard

No data available

Additional Information

RTECS: IO2100000

Nausea, Vomiting, Headache, Tremors, Incoordination., Dizziness, Cyanosis, Seizures., Unconsciousness

Kidney -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish LC50 - Oncorhynchus mykiss (rainbow trout) - 0.01 mg/l - 96.0 h

Toxicity to daphnia and

other aquatic invertebrates

EC50 - Daphnia magna (Water flea) - 0.03 mg/l - 48 h

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

Bioaccumulation Leuciscus idus (Golden orfe) - 3 d

- 0.002 mg/l

Bioconcentration factor (BCF): 3,700

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 2811 Class: 6.1 Packing group: I Proper shipping name: Toxic solids, organic, n.o.s. (Aldrin)

Reportable Quantity (RQ): 1 lbsMarine pollutant:yes

Poison Inhalation Hazard: No

IMDG

UN number: 2811 Class: 6.1 Packing group: I EMS-No: F-A, S-A

Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. (Aldrin)

Marine pollutant:yes

IATA

UN number: 2811 Class: 6.1 Packing group: I

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15. REGULATORY INFORMATION

SARA 302 Components

The following components are subject to reporting levels established by SARA Title III, Section 302:

CAS-No. **Revision Date** Aldrin 309-00-2 2007-07-01

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

nassachasetts Right to Rhow Components		
	CAS-No.	Revision Date
Aldrin	309-00-2	2007-07-01

Pennsylvania Right To Know Components

Aldrin	J	•	CAS-No. 309-00-2	Revision Date 2007-07-01
Aldrin			309-00-2	2007-07-01

	CAS-No.	Revision Date
Aldrin	309-00-2	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Aldrin	309-00-2	2007-07-01

CAS-No

California Prop. 65 Components

WARNING! This product contains a chemical known to the	CAS-No.	Revision Date
State of California to cause cancer.	309-00-2	2007-09-28

Aldrin

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity	
Acute Tox.	Acute toxicity	

Acute aquatic toxicity Aquatic Acute Aquatic Chronic Chronic aquatic toxicity

Carcinogenicity Carc. Fatal if swallowed. H300

H300 + H310 Fatal if swallowed or in contact with skin.

Fatal in contact with skin. H310 Suspected of causing cancer. H351

Causes damage to organs through prolonged or repeated exposure. H372

HMIS Rating

Health hazard:	4
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	4
Fire Hazard:	0
Reactivity Hazard:	0

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Further information

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Preparation Information

Sigma-Aldrich Corporation Product Safety – Americas Region 1-800-521-8956

Version: 4.9 Revision Date: 01/06/2018 Print Date: 11/10/2018

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SAFETY DATA SHEET

Version 5.6 Revision Date 09/23/2016 Print Date 07/18/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : α-BHC solution

Product Number : 40100-U Brand : Supelco

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich

3050 Spruce Street SAINT LOUIS MO 63103

USA

Telephone : +1 800-325-5832 Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 3), H301 Acute toxicity, Inhalation (Category 3), H331 Acute toxicity, Dermal (Category 3), H311 Carcinogenicity (Category 2), H351

Specific target organ toxicity - single exposure (Category 1), H370

Acute aquatic toxicity (Category 3), H402 Chronic aquatic toxicity (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H301 + H311 + H331 Toxic if swallowed, in contact with skin or if inhaled

H351 Suspected of causing cancer. H370 Causes damage to organs.

H412 Harmful to aquatic life with long lasting effects.

Precautionary statement(s)

P201 Obtain special instructions before use.

P202 Do not handle until all safety precautions have been read and

understood.

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P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray. P264 Wash skin thoroughly after handling. P270 Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. P271 Avoid release to the environment. P273 P280 Wear protective gloves/ protective clothing. IF SWALLOWED: Immediately call a POISON CENTER/doctor. P301 + P310 IF ON SKIN: Wash with plenty of soap and water. P302 + P352 IF INHALED: Remove victim to fresh air and keep at rest in a position P304 + P340 comfortable for breathing. P307 + P311 IF exposed: Call a POISON CENTER or doctor/ physician. Specific measures (see supplemental first aid instructions on this label). P322 P330 P361 Remove/Take off immediately all contaminated clothing. Wash contaminated clothing before reuse. P363 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

3.2 Mixtures

Synonyms : α -HCHsolution

Formula : $C_6H_6Cl_6C_6H_6Cl_6$ Molecular weight : 290.83 g/mol

Hazardous components

Component		Classification	Concentration
Methanol			
CAS-No.	67-56-1	Flam. Liq. 2; Acute Tox. 3;	>= 90 - <= 100
EC-No.	200-659-6	STOT SE 1; H225, H301 +	%
Index-No.	603-001-00-X	H311 + H331, H370	
Registration number	01-2119433307-44-XXXX	·	
(1α,2α,3β,4α,5β,6β)-1,2,3,	4,5,6-Hexachlorocyclohexa	ine	
CAS-No.	319-84-6	Acute Tox. 3; Acute Tox. 4;	>= 0.1 - < 1 %
EC-No.	206-270-8	Carc. 2; Aquatic Acute 1;	
Index-No.	602-042-00-0	Aquatic Chronic 1; H301,	
		H312, H351, H410	

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact

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.

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4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

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

Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Recommended storage temperature 2 - 8 °C

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Methanol	67-56-1	TWA	200.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Headache Nausea		

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I I	Dizziness		1		
	Eye damag	ne.			
			s a Biological Exposure Index or Indices		
		(see BEI® section)			
		Danger of cutaneous absorption			
	STEL	250.000000	USA. ACGIH Threshold Limit Values		
	OTEL	ppm	(TLV)		
		PPIII	(127)		
	Headache				
	Nausea				
	Dizziness				
	Eye damag	ae			
			s a Biological Exposure Index or Indices		
	(see BEI®	section)			
	Danger of	cutaneous absorpt	tion		
	TWA	200.000000	USA. NIOSH Recommended		
		ppm	Exposure Limits		
		260.000000			
		mg/m3			
		or dermal absorption			
	ST	250.000000	USA. NIOSH Recommended		
		ppm	Exposure Limits		
		325.000000			
		mg/m3			
		or dermal absorption			
	TWA	200.000000	USA. Occupational Exposure Limits		
		ppm	(OSHA) - Table Z-1 Limits for Air		
		260.000000	Contaminants		
		l ma/m3			
		mg/m3			
		in mg/m3 is appro			
	The value i		vimate. USA. ACGIH Threshold Limit Values (TLV)		
		in mg/m3 is appro	USA. ACGIH Threshold Limit Values		
	TWA	in mg/m3 is appro	USA. ACGIH Threshold Limit Values		
	TWA Headache	in mg/m3 is appro	USA. ACGIH Threshold Limit Values		
	Headache Nausea Dizziness Eye damag	in mg/m3 is approx 200 ppm	USA. ACGIH Threshold Limit Values (TLV)		
	Headache Nausea Dizziness Eye damag Substance	in mg/m3 is approx 200 ppm ge s for which there is	USA. ACGIH Threshold Limit Values		
	TWA Headache Nausea Dizziness Eye damag Substance: (see BEI®	in mg/m3 is approx 200 ppm ge s for which there is section)	USA. ACGIH Threshold Limit Values (TLV) s a Biological Exposure Index or Indices		
	Headache Nausea Dizziness Eye damag Substance (see BEI® Danger of	in mg/m3 is approx 200 ppm ge s for which there is section) cutaneous absorpt	USA. ACGIH Threshold Limit Values (TLV) s a Biological Exposure Index or Indices		
	TWA Headache Nausea Dizziness Eye damag Substance: (see BEI®	in mg/m3 is approx 200 ppm ge s for which there is section)	USA. ACGIH Threshold Limit Values (TLV) s a Biological Exposure Index or Indices tion USA. ACGIH Threshold Limit Values		
	TWA Headache Nausea Dizziness Eye damag Substance (see BEI® Danger of G	in mg/m3 is approx 200 ppm ge s for which there is section) cutaneous absorpt	USA. ACGIH Threshold Limit Values (TLV) s a Biological Exposure Index or Indices		
	TWA Headache Nausea Dizziness Eye damag Substance (see BEI® Danger of 6 STEL Headache	in mg/m3 is approx 200 ppm ge s for which there is section) cutaneous absorpt	USA. ACGIH Threshold Limit Values (TLV) s a Biological Exposure Index or Indices tion USA. ACGIH Threshold Limit Values		
	TWA Headache Nausea Dizziness Eye damag Substance (see BEI® Danger of of STEL Headache Nausea	in mg/m3 is approx 200 ppm ge s for which there is section) cutaneous absorpt	USA. ACGIH Threshold Limit Values (TLV) s a Biological Exposure Index or Indices tion USA. ACGIH Threshold Limit Values		
	TWA Headache Nausea Dizziness Eye damag Substances (see BEI® Danger of of STEL Headache Nausea Dizziness	ge s for which there is section) cutaneous absorpt	USA. ACGIH Threshold Limit Values (TLV) s a Biological Exposure Index or Indices tion USA. ACGIH Threshold Limit Values		
	TWA Headache Nausea Dizziness Eye damag Substances (see BEI® Danger of of STEL Headache Nausea Dizziness Eye damag	ge s for which there is section) cutaneous absorption 250 ppm	USA. ACGIH Threshold Limit Values (TLV) s a Biological Exposure Index or Indices tion USA. ACGIH Threshold Limit Values (TLV)		
	TWA Headache Nausea Dizziness Eye damag Substances (see BEI® Danger of of STEL Headache Nausea Dizziness Eye damag Substances	ge s for which there is section) 250 ppm	USA. ACGIH Threshold Limit Values (TLV) s a Biological Exposure Index or Indices tion USA. ACGIH Threshold Limit Values		
	TWA Headache Nausea Dizziness Eye damag Substances (see BEI® Danger of of STEL Headache Nausea Dizziness Eye damag Substances (see BEI®	ge s for which there is section) 250 ppm	USA. ACGIH Threshold Limit Values (TLV) s a Biological Exposure Index or Indices tion USA. ACGIH Threshold Limit Values (TLV) s a Biological Exposure Index or Indices		
	TWA Headache Nausea Dizziness Eye damag Substance: (see BEI® Danger of of STEL Headache Nausea Dizziness Eye damag Substance: (see BEI® Danger of of	ge s for which there is section) ge s for which there is section) cutaneous absorption ge s for which there is section) cutaneous absorption is section) cutaneous absorption is section) cutaneous absorption is section is section is section is section is section.	USA. ACGIH Threshold Limit Values (TLV) s a Biological Exposure Index or Indices tion USA. ACGIH Threshold Limit Values (TLV) s a Biological Exposure Index or Indices tion		
	TWA Headache Nausea Dizziness Eye damag Substances (see BEI® Danger of of STEL Headache Nausea Dizziness Eye damag Substances (see BEI®	ge s for which there is section) ge s for which there is section) cutaneous absorption ge s for which there is section) cutaneous absorption 250 ppm	USA. ACGIH Threshold Limit Values (TLV) s a Biological Exposure Index or Indices tion USA. ACGIH Threshold Limit Values (TLV) s a Biological Exposure Index or Indices tion USA. NIOSH Recommended		
	TWA Headache Nausea Dizziness Eye damag Substances (see BEI® Danger of of STEL Headache Nausea Dizziness Eye damag Substances (see BEI® Danger of of TWA	ge s for which there is section) 250 ppm ge s for which there is section) cutaneous absorption ge s for which there is section) cutaneous absorption 250 ppm 260 ppm 260 mg/m3	USA. ACGIH Threshold Limit Values (TLV) s a Biological Exposure Index or Indices tion USA. ACGIH Threshold Limit Values (TLV) s a Biological Exposure Index or Indices tion USA. NIOSH Recommended Exposure Limits		
	TWA Headache Nausea Dizziness Eye damag Substances (see BEI® Danger of of STEL Headache Nausea Dizziness Eye damag Substances (see BEI® Danger of of TWA Potential for	ge s for which there is section) cutaneous absorption (200 ppm) 200 ppm 200 ppm 260 mg/m3 or dermal absorption (200 ppm) (USA. ACGIH Threshold Limit Values (TLV) s a Biological Exposure Index or Indices tion USA. ACGIH Threshold Limit Values (TLV) s a Biological Exposure Index or Indices tion USA. NIOSH Recommended Exposure Limits on		
	TWA Headache Nausea Dizziness Eye damag Substances (see BEI® Danger of of STEL Headache Nausea Dizziness Eye damag Substances (see BEI® Danger of of TWA	ge s for which there is section) 250 ppm ge s for which there is section) cutaneous absorption ge s for which there is section) cutaneous absorption 250 ppm 260 ppm 260 mg/m3	USA. ACGIH Threshold Limit Values (TLV) s a Biological Exposure Index or Indices tion USA. ACGIH Threshold Limit Values (TLV) s a Biological Exposure Index or Indices tion USA. NIOSH Recommended Exposure Limits		
	Headache Nausea Dizziness Eye damag Substances (see BEI® Danger of of STEL Headache Nausea Dizziness Eye damag Substances (see BEI® Danger of of TWA Potential for ST	ge s for which there is section) cutaneous absorption 200 ppm 250 ppm 200 ppm 260 mg/m3 or dermal absorption 250 ppm	USA. ACGIH Threshold Limit Values (TLV) s a Biological Exposure Index or Indices tion USA. ACGIH Threshold Limit Values (TLV) s a Biological Exposure Index or Indices tion USA. NIOSH Recommended Exposure Limits On USA. NIOSH Recommended Exposure Limits		
	Headache Nausea Dizziness Eye damag Substances (see BEI® Danger of of STEL Headache Nausea Dizziness Eye damag Substances (see BEI® Danger of of TWA Potential for ST	ge s for which there is section) cutaneous absorption 200 ppm ge s for which there is section) cutaneous absorption 250 ppm 200 ppm 200 ppm 260 mg/m3 or dermal absorption 250 ppm 325 mg/m3	USA. ACGIH Threshold Limit Values (TLV) s a Biological Exposure Index or Indices tion USA. ACGIH Threshold Limit Values (TLV) s a Biological Exposure Index or Indices tion USA. NIOSH Recommended Exposure Limits On USA. NIOSH Recommended Exposure Limits		
	TWA Headache Nausea Dizziness Eye damag Substances (see BEI® Danger of of STEL Headache Nausea Dizziness Eye damag Substances (see BEI® Danger of of TWA Potential for ST	ge s for which there is section) cutaneous absorption 200 ppm 250 ppm 260 mg/m3 or dermal absorption 325 mg/m3 or dermal absorption dermal absorption and dermal absorption are dermal absorption and dermal absorption are dermal are dermal absorption are dermal are	USA. ACGIH Threshold Limit Values (TLV) s a Biological Exposure Index or Indices tion USA. ACGIH Threshold Limit Values (TLV) s a Biological Exposure Index or Indices tion USA. NIOSH Recommended Exposure Limits on USA. NIOSH Recommended Exposure Limits on USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air		
	TWA Headache Nausea Dizziness Eye damag Substances (see BEI® Danger of of STEL Headache Nausea Dizziness Eye damag Substances (see BEI® Danger of of TWA Potential for ST Potential for TWA	ge s for which there is section) cutaneous absorption 200 ppm 250 ppm 260 mg/m3 or dermal absorption 200 ppm 325 mg/m3 or dermal absorption 200 ppm	USA. ACGIH Threshold Limit Values (TLV) s a Biological Exposure Index or Indices tion USA. ACGIH Threshold Limit Values (TLV) s a Biological Exposure Index or Indices tion USA. NIOSH Recommended Exposure Limits on USA. NIOSH Recommended Exposure Limits on USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants		

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STEL	250 ppm 325 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
Skin nota	tion	
TWA	200 ppm 260 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
Skin nota	tion	
С	1,000 ppm	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
Skin		
PEL	200 ppm 260 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
Skin		
STEL	250 ppm 325 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
Skin		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Methanol	67-56-1	Methanol	15.0000 mg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift (A	As soon as p	ossible after expe	osure ceases)
		Methanol	15 mg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift (A	As soon as p	ossible after expe	osure ceases)

8.2 Exposure controls

Appropriate engineering controls

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: butyl-rubber

Minimum layer thickness: 0.3 mm Break through time: 480 min

Material tested:Butoject® (KCL 897 / Aldrich Z677647, Size M)

Splash contact Material: Nitrile rubber

Minimum layer thickness: 0.4 mm Break through time: 30 min

Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method:

EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an

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industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
I)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	No data available
0)	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

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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

Acids, Oxidizing agents, Alkali metals, Strong oxidizing agents, Acid chlorides, Acid anhydrides, Reducing agents

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

No data available

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

IARC: 2B - Group 2B: Possibly carcinogenic to humans ($(1\alpha,2\alpha,3\beta,4\alpha,5\beta,6\beta)$ -1,2,3,4,5,6-

Hexachlorocyclohexane)

IARC: 2B - Group 2B: Possibly carcinogenic to humans $((1\alpha,2\alpha,3\beta,4\alpha,5\beta,6\beta)-1,2,3,4,5,6-$

Hexachlorocyclohexane)

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a

carcinogen or potential carcinogen by ACGIH.

NTP: Reasonably anticipated to be a human carcinogen $((1\alpha,2\alpha,3\beta,4\alpha,5\beta,6\beta)-1,2,3,4,5,6-1)$

Hexachlorocyclohexane)

NTP: Reasonably anticipated to be a human carcinogen $((1\alpha,2\alpha,3\beta,4\alpha,5\beta,6\beta)-1,2,3,4,5,6-1)$

Hexachlorocyclohexane)

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.

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Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: Not available

Methyl alcohol may be fatal or cause blindness if swallowed., Cannot be made non-poisonous., Effects due to ingestion may include:, Nausea, Dizziness, Gastrointestinal disturbance, Weakness, Confusion., Drowsiness, Unconsciousness, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Central nervous system - Breathing difficulties - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

No data available

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Harmful to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1230 Class: 3 Packing group: II

Proper shipping name: Methanol Reportable Quantity (RQ): 5000 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 1230 Class: 3 (6.1) Packing group: II EMS-No: F-E, S-D

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Proper shipping name: METHANOL

IATA

UN number: 1230 Class: 3 (6.1) Packing group: II

Proper shipping name: Methanol

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels esta	ablished by SARA Tit	le III, Section 313:
	CAS-No.	Revision Date
Methanol	67-56-1	2007-07-01
$(1\alpha,2\alpha,3\beta,4\alpha,5\beta,6\beta)$ -1,2,3,4,5,6-Hexachlorocyclohexane	319-84-6	2007-07-01

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-NO.	Mevision Date
Methanol	67-56-1	2007-07-01
$(1\alpha,2\alpha,3\beta,4\alpha,5\beta,6\beta)$ -1,2,3,4,5,6-Hexachlorocyclohexane	319-84-6	2007-07-01

CAS No

Povision Data

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Methanol	67-56-1	2007-07-01
$(1\alpha,2\alpha,3\beta,4\alpha,5\beta,6\beta)$ -1,2,3,4,5,6-Hexachlorocyclohexane	319-84-6	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Methanol	67-56-1	2007-07-01
$(1\alpha,2\alpha,3\beta,4\alpha,5\beta,6\beta)$ -1,2,3,4,5,6-Hexachlorocyclohexane	319-84-6	2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the	CAS-No.	Revision Date
State of California to cause cancer.	319-84-6	2009-02-01
(1α,2α,3β,4α,5β,6β)-1,2,3,4,5,6-Hexachlorocyclohexane		

WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive	CAS-No. 67-56-1	Revision Date 2012-03-16
harm.		

Methanol

WARNING! This product contains a chemical known to the	CAS-No.	Revision Date
State of California to cause cancer.	319-84-6	2009-02-01
(1α,2α,3β,4α,5β,6β)-1,2,3,4,5,6-Hexachlorocyclohexane		

WARNING: This product contains a chemical known to the	CAS-No.	Revision Date
State of California to cause birth defects or other reproductive	67-56-1	2012-03-16

harm. Methanol

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox. Acute toxicity

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Aquatic Chronic Chronic aquatic toxicity

Carc. Carcinogenicity
Flam. Liq. Flammable liquids

H225 Highly flammable liquid and vapour.

H301 Toxic if swallowed.

H301 + H311 + Toxic if swallowed, in contact with skin or if inhaled

H331

H311 Toxic in contact with skin. H312 Harmful in contact with skin.

H331 Toxic if inhaled.

H351 Suspected of causing cancer. H370 Causes damage to organs. H402 Harmful to aquatic life.

Very toxic to aquatic life with long lasting effects.
 H412 Harmful to aquatic life with long lasting effects.
 STOT SE Specific target organ toxicity - single exposure

HMIS Rating

Health hazard: 2
Chronic Health Hazard: *
Flammability: 0
Physical Hazard 0

NFPA Rating

Health hazard: 2
Fire Hazard: 0
Reactivity Hazard: 0

Further information

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Preparation Information

Sigma-Aldrich Corporation Product Safety – Americas Region 1-800-521-8956

Version: 5.6 Revision Date: 09/23/2016 Print Date: 07/18/2019

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SAFETY DATA SHEET

Version 4.8 Revision Date 10/27/2017 Print Date 06/28/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Aroclor 1242

Product Number : 48585
Brand : Supelco
Index-No. : 602-039-00-4

CAS-No. : 53469-21-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich

3050 Spruce Street

SAINT LOUIS MO 63103

USA

Telephone : +1 800-325-5832 Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Specific target organ toxicity - repeated exposure (Category 1), H372

Acute aquatic toxicity (Category 1), H400 Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)

H372 Causes damage to organs through prolonged or repeated exposure.

H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.

P264 Wash skin thoroughly after handling.

P270 Do not eat, drink or smoke when using this product.

P273 Avoid release to the environment.

P314 Get medical advice/ attention if you feel unwell.

P391 Collect spillage.

P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

CAS-No. : 53469-21-9 Index-No. : 602-039-00-4

Hazardous components

Component	Classification	Concentration
Aroclor 1242		
	STOT RE 1; Aquatic Acute 1; Aquatic Chronic 1; H372, H410	90 - 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

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 breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.

For personal protection see section 8.

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6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Storage class (TRGS 510): 12: Non Combustible Liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control	Basis		
			parameters			
Aroclor 1242	53469-21-9	TWA	1.000000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)		
	Remarks					
		TWA	0.001000	USA. NIOSH Recommended		
			mg/m3	Exposure Limits		
		Potential Occupational Carcinogen See Appendix A				
		TWA	1.000000	USA. Occupational Exposure Limits		
			mg/m3	(OSHA) - Table Z-1 Limits for Air		
				Contaminants		
		Skin designation				
		TWA	1 mg/m3	USA. ACGIH Threshold Limit Values		
				(TLV)		
		Eye irritation				
		Liver damage				
		Chloracne				
		Danger of cu	on			
		TWA	0.001 mg/m3	USA. NIOSH Recommended		
				Exposure Limits		
		Potential Occupational Carcinogen				
		See Append	ix A			
		TWA	1 mg/m3	USA. Occupational Exposure Limits		
				(OSHA) - Table Z-1 Limits for Air		
				Contaminants		
		Skin designation				
		PEL	1 mg/m3	California permissible exposure		
				limits for chemical contaminants		
				(Title 8, Article 107)		
	_	Skin	<u> </u>			

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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

Eve/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multipurpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pН	No data available
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition	No data available

Supelco - 48585 Page 4 of 8 temperature

r) Viscosity No data available
 s) Explosive properties No data available
 t) Oxidizing properties No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 4,250 mg/kg

Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and Taste): Eye: Chromodacryorrhea. Diarrhoea Nutritional and Gross Metabolic: Weight loss or decreased weight gain.

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as

probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a

known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a

carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

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No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

Causes damage to organs through prolonged or repeated exposure.

No data available

Aspiration hazard

No data available

Additional Information

RTECS: Not available

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish LC50 - Pimephales promelas (fathead minnow) - 0.015 mg/l - 96 h

Toxicity to daphnia and

other aquatic

LC50 - Daphnia magna (Water flea) - 0.23 mg/l - 48 h

Toxicity to algae LC50 - Algae - 0.006 mg/l - 28 h

12.2 Persistence and degradability

Biodegradability Result: - According to the results of tests of biodegradability this product is not

> readily biodegradable. Remarks: No data available

12.3 Bioaccumulative potential

invertebrates

Bioaccumulation Pimephales promelas (fathead minnow) - 8.5 Months

- 0.86 µg/l

Bioconcentration factor (BCF): 274,000

Mobility in soil 12.4

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic life with long lasting effects.

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 2315 Class: 9 Packing group: II

Proper shipping name: Polychlorinated biphenyls, liquid

Reportable Quantity (RQ): 1 lbs Poison Inhalation Hazard: No

Supelco - 48585 Page 6 of 8 **IMDG**

UN number: 2315 Class: 9 Packing group: II EMS-No: F-A, S-A

Proper shipping name: POLYCHLORINATED BIPHENYLS, LIQUID

Marine pollutant: yes

IATA

UN number: 2315 Class: 9 Packing group: II

Proper shipping name: Polychlorinated biphenyls, liquid

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Massachusetts Right To Know Components

mussusmussus right to raisin components	CAS-No.	Revision Date
Aroclor 1242	53469-21-9	1993-04-24
Aroclor 1242	CAS-No. 53469-21-9	Revision Date 1993-04-24
Pennsylvania Right To Know Components	00100 21 0	1000 01 21
remisylvania Right To Know Components	CAS-No.	Revision Date
Aroclor 1242	53469-21-9	1993-04-24
Aroclor 1242	CAS-No. 53469-21-9	Revision Date 1993-04-24
7,100,01 12.12	00100 21 0	1000 01 21
	CAS-No.	Revision Date
Aroclor 1242	53469-21-9	1993-04-24
New Jersey Right To Know Components	0.4.0.1.1	
Aroclor 1242	CAS-No. 53469-21-9	Revision Date 1993-04-24
	CAS-No.	Revision Date
Aroclor 1242	53469-21-9	1993-04-24
California Prop. 65 Components	CAC No	Davisian Data
WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No. 53469-21-9	Revision Date 2008-08-01
Aroclor 1242		
WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive	CAS-No. 53469-21-9	Revision Date 2008-08-01
harm.	33 100 21 0	2000 00 01
Aroclor 1242		

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute Acute aquatic toxicity
Aquatic Chronic Chronic aquatic toxicity

H372 Causes damage to organs through prolonged or repeated exposure.

H400 Very toxic to aquatic life.

H410 Very toxic to aquatic life with long lasting effects.
STOT RE Specific target organ toxicity - repeated exposure

HMIS Rating

Health hazard: 1
Chronic Health Hazard:
Flammability: 0
Physical Hazard 0

NFPA Rating

Health hazard: 0
Fire Hazard: 0
Reactivity Hazard: 0

Further information

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Preparation Information

Sigma-Aldrich Corporation Product Safety – Americas Region 1-800-521-8956

Version: 4.8 Revision Date: 10/27/2017 Print Date: 06/28/2019

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SAFETY DATA SHEET

Version 6.2 Revision Date 03/12/2019 Print Date 06/28/2019

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Antimony

Product Number : 266329
Brand : Aldrich
CAS-No. : 7440-36-0

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.

3050 Spruce Street ST. LOUIS MO 63103

UNITED STATES

Telephone : +1 314 771-5765 Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 3), H301

Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)

H301 Toxic if swallowed.

H335 May cause respiratory irritation.

Precautionary statement(s)

P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.

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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.

P301 + P310 + P330 IF SWALLOWED: Immediately call a POISON CENTER/doctor.

Rinse mouth.

P304 + P340 + P312 IF INHALED: Remove person to fresh air and keep comfortable

for breathing. Call a POISON CENTER/doctor if you feel unwell.

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

P405 Store locked up.

P501 Dispose of contents/ container to an approved waste disposal

plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula : Sb

Molecular weight : 121.76 g/mol CAS-No. : 7440-36-0 EC-No. : 231-146-5

Component	Classification	Concentration
Antimony		
	Acute Tox. 3; STOT SE 3;	<= 100 %
	H301, H335	

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

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4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Antimony oxide

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust. For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs. Avoid contact with skin and eyes. Avoid formation of dust and aerosols.

Provide appropriate exhaust ventilation at places where dust is formed. For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Air sensitive. Moisture sensitive. Handle and store under inert gas. Keep in a dry place.

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Storage class (TRGS 510): 6.1D: Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

components t	vicii workpiace	contro. pe	accc. 5	
Component	CAS-No.	Value	Control parameters	Basis
Antimony	7440-36-0	TWA	0.5 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	0.5 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	0.5 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Upper Res Skin irritat	piratory Tract ir ion	ritation
		PEL	0.5 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

8.2 Exposure controls

Appropriate engineering controls

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Aldrich - 266329

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)



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data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N99 (US) or type P2 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a) Appearance Form: powder

b) Odour No data available

c) Odour Threshold No data available

d) pH No data available

e) Melting point/range: 630 °C (1166 °F) - lit.

point/freezing point

(f) Initial boiling point 1,635 °C 2,975 °F - lit. and boiling range

g) Flash point ()Not applicable

h) Evaporation rate No data available

i) Flammability (solid, No data available gas)

j) Upper/lower flammability or

explosive limits

No data available

k) Vapour pressure No data availablel) Vapour density No data available

m) Relative density 6.69 g/cm3 at 25 °C (77 °F)

n) Water solubility No data available

o) Partition coefficient: Not applicable for inorganic substances

n-octanol/water



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p) Auto-ignition No data available temperature

q) Decomposition No data available temperature

r) Viscosity No data availables) Explosive properties No data availablet) Oxidizing properties No data available

9.2 Other safety information

No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Antimony oxide Other decomposition products - No data available

In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 100 mg/kg Inhalation: No data available Dermal: No data available No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

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IARC: No component of this product present at levels greater than or equal to 0.1% is

identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is

identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is

on OSHA's list of regulated carcinogens.

Reproductive toxicity

No data available No data available

Specific target organ toxicity - single exposure

May cause respiratory irritation.

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: CC4025000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence Stomach - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish LC50 - Cyprinodon variegatus (sheepshead minnow) - 6.2 - 8.3 mg/l

- 96.0 h

Remarks: No data available

12.2 Persistence and degradability

Biodegradability Result: - According to the results of tests of biodegradability this

product is not readily biodegradable.

Remarks: The methods for determining biodegradability are not

applicable to inorganic substances.

12.3 Bioaccumulative potential

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



SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

SECTION 14: Transport information

DOT (US)

UN number: 2871 Class: 6.1 Packing group: III

Proper shipping name: Antimony powder Reportable Quantity (RQ): 5000 lbs Poison Inhalation Hazard: No

IMDG

UN number: 2871 Class: 6.1 Packing group: III EMS-No: F-A, S-A

Proper shipping name: ANTIMONY POWDER

Marine pollutant : yes

IATA

UN number: 2871 Class: 6.1 Packing group: III

Proper shipping name: Antimony powder

SECTION 15: Regulatory information

SARA 302 Components

This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

CAS-No. Revision Date Antimony 7440-36-0 2007-07-01

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

Antimony CAS-No. Revision Date

7440-36-0 2007-07-01

Antimony CAS-No. Revision Date 7440-36-0 2007-07-01

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New Jersey Right To Know Components

Antimony

CAS-No. 7440-36-0 Revision Date 2007-07-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

SECTION 16: Other information

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.2 Revision Date: 03/12/2019 Print Date: 06/28/2019

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SAFETY DATA SHEET

Version 4.13 Revision Date 09/12/2018 Print Date 06/28/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Arsenic

Product Number : 202657
Brand : Aldrich

Index-No. : 033-001-00-X

CAS-No. : 7440-38-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich

3050 Spruce Street SAINT LOUIS MO 63103

USA

Telephone : +1 800-325-5832 Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 4), H302 Acute toxicity, Inhalation (Category 3), H331 Carcinogenicity (Category 1B), H350 Acute aquatic toxicity (Category 1), H400 Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)

H302 Harmful if swallowed. H331 Toxic if inhaled. H350 May cause cancer.

H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201 Obtain special instructions before use.

P202 Do not handle until all safety precautions have been read and

understood.

P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.

P264 Wash skin thoroughly after handling.

P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.

P273 Avoid release to the environment.

P280 Wear protective gloves/ protective clothing/ eye protection/ face

protection.

P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell.

Rinse mouth.

P304 + P340 + P311 IF INHALED: Remove person to fresh air and keep comfortable for

breathing. Call a POISON CENTER/doctor.

P308 + P313 IF exposed or concerned: Get medical advice/ attention.

P391 Collect spillage.

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

P405 Store locked up.

P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula : As

 Molecular weight
 : 74.92 g/mol

 CAS-No.
 : 7440-38-2

 EC-No.
 : 231-148-6

 Index-No.
 : 033-001-00-X

Hazardous components

Component	Classification	Concentration
Arsenic		
	Acute Tox. 4; Acute Tox. 3;	90 - 100 %
	Carc. 1B; Aquatic Acute 1;	
	Aquatic Chronic 1; H302,	
	H331, H350, H410	

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

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

Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.

Provide appropriate exhaust ventilation at places where dust is formed.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Keep in a dry place.

Storage class (TRGS 510): 6.1B: Non-combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Componente with werkplace centrer parameters						
Component	CAS-No.	Value	Control	Basis		
			parameters			
Arsenic	7440-38-2	TWA	0.01 mg/m3	USA. ACGIH Threshold Limit Values		
				(TLV)		
	Remarks	Lung cancer				
		Substances for which there is a Biological Exposure Index or Indices				
		(see BEI® section)				
		Confirmed h	numan carcinogen			

С	0.0020 mg/m3	USA. NIOSH Recommended Exposure Limits		
	al Occupational Carcin pendix A	ogen		
15 minu	15 minute ceiling value			

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological	Basis		
				specimen			
	-	inorganic	35µg As/l	Urine	ACGIH - Biological		
		arsenic plus			Exposure Indices		
		methylated			(BEI)		
		metabolites					
	Remarks	End of the workweek (After four or five consecutive working days					
		with exposure)	with exposure)				

8.2 Exposure controls

Appropriate engineering controls

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method:

EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

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9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance Form: powder

Colour: light grey, black

b) Odourc) Odour Thresholdd) pHNo data availableNo data available

e) Melting point/freezing

point

Melting point/range: 817 °C (1,503 °F) - lit.

f) Initial boiling point and

boiling range

613 °C (1,135 °F) - lit.

g) Flash point Not applicable
h) Evaporation rate No data available
i) Flammability (solid, gas) No data available

j) Upper/lower flammability or explosive limits No data available

k) Vapour pressure No data availablel) Vapour density No data available

m) Relative density 5.727 g/mL at 25 °C (77 °F)

n) Water solubility No data availableo) Partition coefficient: n- No data available

octanol/water

Auto-ignition temperature

No data available

q) Decomposition

temperature

No data available

r) Viscosity No data available
 s) Explosive properties No data available
 t) Oxidizing properties No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

Heat Exposure to air may affect product quality.

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Arsenic oxides Other decomposition products - No data available

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11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 763 mg/kg

Remarks: Behavioral: Ataxia. Diarrhoea

LD50 Oral - Mouse - 145 mg/kg

Remarks: Behavioral: Ataxia. Diarrhoea

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 Carcinogenicity

No data available

IARC: 1 - Group 1: Carcinogenic to humans (Arsenic)

NTP: Known - Known to be human carcinogen (Arsenic)

OSHA: OSHA specifically regulated carcinogen (Arsenic)

Reproductive toxicity

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: CG0525000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish LC50 - Pimephales promelas (fathead minnow) - 9.9 mg/l - 96.0 h

Toxicity to daphnia and EC50 - Daphnia magna (Water flea) - 3.8 mg/l - 48 h

other aquatic invertebrates

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

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12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1558 Class: 6.1 Packing group: II

Proper shipping name: Arsenic

Reportable Quantity (RQ): 1 lbsReportable Quantity (RQ): 1 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 1558 Class: 6.1 Packing group: II EMS-No: F-A, S-A

Proper shipping name: ARSENIC

Marine pollutant:yes

IATA

UN number: 1558 Class: 6.1 Packing group: II

Proper shipping name: Arsenic

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

CAS-No. Revision Date 7440-38-2 2015-11-23

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Reportable Quantity D004 lbs

Massachusetts Right To Know Components

Arsenic CAS-No. Revision Date 7440-38-2 2015-11-23

Pennsylvania Right To Know Components

Arsenic CAS-No. Revision Date 7440-38-2 2015-11-23

Arsenic CAS-No. Revision Date 7440-38-2 2015-11-23

New Jersey Right To Know Components

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CAS-No. Revision Date 7440-38-2 2015-11-23

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer. CAS-No. Revision Date 2007-09-28

Arsenic

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox. Acute toxicity

Aquatic Acute Acute aquatic toxicity
Aquatic Chronic Chronic aquatic toxicity

Carc. Carcinogenicity
H302 Harmful if swallowed.
H331 Toxic if inhaled.
H350 May cause cancer.
H400 Very toxic to aquatic life.

H410 Very toxic to aquatic life with long lasting effects.

Further information

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Preparation Information

Sigma-Aldrich Corporation Product Safety – Americas Region 1-800-521-8956

Version: 4.13 Revision Date: 09/12/2018 Print Date: 06/28/2019

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SAFETY DATA SHEET

Version 6.1 Revision Date 05/28/2017 Print Date 06/28/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Barium

Product Number : 474711 Brand : Aldrich

CAS-No. : 7440-39-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.

3050 Spruce Street ST. LOUIS MO 63103 UNITED STATES

Telephone : +1 314 771-5765 Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Substances and mixtures, which in contact with water, emit flammable gases (Category 2), H261

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)

H261 In contact with water releases flammable gases.

Precautionary statement(s)

P223 Do not allow contact with water.

P231 + P232 Handle under inert gas. Protect from moisture.

P280 Wear protective gloves/ eye protection/ face protection.

P335 + P334 Brush off loose particles from skin. Immerse in cool water/ wrap in wet

bandages.

P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to

extinguish.

P402 + P404 Store in a dry place. Store in a closed container.

P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula : Ba

Molecular weight : 137.33 g/mol CAS-No. : 7440-39-3 EC-No. : 231-149-1

Hazardous components

Component	Classification	Concentration
Barium		
	Water-react. 2; H261	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Dry powder

5.2 Special hazards arising from the substance or mixture

Barium oxide

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.

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For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wetbrushing and place in container for disposal according to local regulations (see section 13). Do not flush with water. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Further processing of solid materials may result in the formation of combu formation should be taken into consideration before additional processing

Provide appropriate exhaust ventilation at places where dust is formed. Keep away from sources of ignition - No smoking.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Never allow product to get in contact with water during storage.

Store under inert gas.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis		
Barium	7440-39-3	TWA	0.500000	USA. ACGIH Threshold Limit Values		
			mg/m3	(TLV)		
	Remarks	Eye, skin, &	Gastrointestinal irr	itation		
		Muscular stir	mulation			
		Not classifial	ole as a human ca	rcinogen		
		TWA	0.500000	USA. Occupational Exposure Limits		
			mg/m3	(OSHA) - Table Z-1 Limits for Air		
				Contaminants		
		TWA	0.500000	USA. ACGIH Threshold Limit Values		
			mg/m3	(TLV)		
		Eye irritation				
		Muscular stir				
		Skin irritation				
		Gastrointest				
			ole as a human ca	<u> </u>		
		TWA	0.500000	USA. NIOSH Recommended		
			mg/m3	Exposure Limits		
		TWA	0.5 mg/m3	USA. Occupational Exposure Limits		
				(OSHA) - Table Z-1 Limits for Air		
				Contaminants		
		TWA	0.5 mg/m3	USA. ACGIH Threshold Limit Values (TLV)		
		Eye irritation				
		Muscular stimulation				
		Skin irritation				
		Gastrointestinal irritation				
		Not classifial	ole as a human ca	rcinogen		

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TWA	0.5 mg/m3	USA. NIOSH Recommended
		Exposure Limits

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

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 industria situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Flame retardant protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use (EN 143) respirator cartridges as a backup to engineering controls. If th full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance Form: Pieces Colour: grey

No data available No data available

d) pH No data available

e) Melting point/freezing Melting point/range: 725 °C (1337 °F) - lit.

point

b) Odour

f) Initial boiling point and 1,640

boiling range

c) Odour Threshold

1,640 °C (2,984 °F) - lit.

g) Flash point ()Not applicableh) Evaporation rate No data available

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i) Flammability (solid, gas) No data available

j) Upper/lower No data available flammability or

explosive limits

k) Vapour pressure No data availablel) Vapour density No data available

m) Relative density 3.6 g/cm3 at 25 °C (77 °F)

n) Water solubility No data available
 o) Partition coefficient: n- No data available octanol/water

p) Auto-ignition No data available temperature

q) Decomposition No data available temperature

r) Viscosity No data availables) Explosive properties No data availablet) Oxidizing properties No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

Reacts violently with water.

10.4 Conditions to avoid

Exposure to moisture

10.5 Incompatible materials

Oxidizing agents, Water, acids, Oxygen, Chlorinated solvents, Carbon dioxide (CO2), Halogens, Halogenated hydrocarbon, Alcohols, Sulphur compounds, Hydrogen sulfide gas

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Barium oxide

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

No data availableBarium

Inhalation: No data available(Barium)
Dermal: No data available(Barium)

No data available(Barium)

Skin corrosion/irritation

No data available(Barium)

Serious eye damage/eye irritation

No data available(Barium)

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Respiratory or skin sensitisation

No data available(Barium)

Germ cell mutagenicity

No data available(Barium)

Carcinogenicity

This product is or contains a component that is not classifiable as to its classification.(Barium) (Barium)

(Barium)

Reproductive toxicity

No data available(Barium)

No data available(Barium)

Specific target organ toxicity - single exposure

No data available(Barium)

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available(Barium)

Additional Information

RTECS: CQ8370000

Stomach/intestinal disorders, Nausea, Vomiting, Drowsiness, Dizziness, Gastrointestinal disturbance, Weakness, Tremors, Seizures.(Barium)

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.(Barium)

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish mortality NOEC - Cyprinodon variegatus (sheepshead minnow) - 500 mg/l - 96

h(Barium)

LC50 - Cyprinodon variegatus (sheepshead minnow) - > 500 mg/l - 96

h(Barium)

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available(Barium)

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber b highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1400 Class: 4.3 Packing group: II

Proper shipping name: Barium

Reportable Quantity (RQ) : 1000 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 1400 Class: 4.3 Packing group: II EMS-No: F-G, S-O

Proper shipping name: BARIUM

IATA

UN number: 1400 Class: 4.3 Packing group: II

Proper shipping name: Barium

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313: CAS-No. Revision Date

Barium 7440-39-3 2007-07-01

SARA 311/312 Hazards

Reactivity Hazard

Massachusetts Right To Know Components

 Barium
 CAS-No.
 Revision Date

 2007-07-01
 2007-07-01

Pennsylvania Right To Know Components

CAS-No. Revision Date Barium 7440-39-3 2007-07-01

New Jersey Right To Know Components

CAS-No. Revision Date Barium 7440-39-3 2007-07-01

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

H261 In contact with water releases flammable gases.

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HMIS Rating

Health hazard: 0
Chronic Health Hazard:
Flammability: 3
Physical Hazard 1

NFPA Rating

Health hazard: 0
Fire Hazard: 3
Reactivity Hazard: 1
Special hazard.1: W

Further information

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Preparation Information

Sigma-Aldrich Corporation Product Safety – Americas Region 1-800-521-8956

Version: 6.1 Revision Date: 05/28/2017 Print Date: 06/28/2019

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SAFETY DATA SHEET

Version 5.8 Revision Date 02/02/2018 Print Date 10/19/2018

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Benzo[a]pyrene

Product Number : 48564
Brand : Supelco
Index-No. : 601-032-00-3

CAS-No. : 50-32-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

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)

Skin sensitisation (Category 1), H317

Germ cell mutagenicity (Category 1B), H340

Carcinogenicity (Category 1B), H350 Reproductive toxicity (Category 1B), H360

Acute aquatic toxicity (Category 1), H400

Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)

H317 May cause an allergic skin reaction.

H340 May cause genetic defects.

H350 May cause cancer.

H360 May damage fertility or the unborn child.

H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201 Obtain special instructions before use.

P202 Do not handle until all safety precautions have been read and

understood.

P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.

P272 Contaminated work clothing should not be allowed out of the workplace.

P273 Avoid release to the environment.

P280 Wear protective gloves/ protective clothing/ eye protection/ face

protection.

P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.

P363 Wash contaminated clothing before reuse.

P391 Collect spillage. P405 Store locked up.

P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : 3,4-Benzpyrene

3,4-Benzopyrene Benzo[def]chrysene benzo[pqr]tetraphene

Formula : C₂₀H₁₂

Molecular weight : 252.31 g/mol
CAS-No. : 50-32-8

EC-No. : 200-028-5
Index-No. : 601-032-00-3

Hazardous components

Component	Classification	Concentration
Benzo[a]pyrene		
	Skin Sens. 1; Muta. 1B; Carc.	90 - 100 %
	1B; Repr. 1B; Aquatic Acute 1;	
	Aquatic Chronic 1; H317,	
	H340, H350, H360, H410	

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

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4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

No data available

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.

Provide appropriate exhaust ventilation at places where dust is formed.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Store at room temperature.

Storage class (TRGS 510): 6.1D: Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Componente man nompiaco control parametero						
Component	CAS-No.	Value	Control parameters	Basis		
	Remarks	(see BEI® se (PAHs)	ection), see BEI® f	Biological Exposure Index or Indices or Polycyclic Aromatic Hydrocarbons be carefully controlled to levels as low		

		as possible.				
		Suspected h	numan carcinoger	١		
		Cancer				
		Substances for which there is a Biological Exposure Index or Indices (see BEI® section), see BEI® for Polycyclic Aromatic Hydrocarbons (PAHs) Exposure by all routes should be carefully controlled to levels as low as possible. Suspected human carcinogen				
Benzo[a]pyrene	50-32-8	TWA	0.200000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants		
		TWA	0.200000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants		
		1910.1002				
				e Z-1), coal tar pitch volatiles include		
		the fused polycyclic hydrocarbons which volatilize from the distillation residues of coal, petroleum (excluding asphalt), wood, and other organic matter. Asphalt (CAS 8052-42-4, and CAS 64742-93-4) is not covered under the 'coal tar pitch volatiles' standard				
			fically regulated of			
		TWA	0.100000	USA. NIOSH Recommended		
			mg/m3	Exposure Limits		
		Potential Occupational Carcinogen NIOSH considers coal tar, coal tar pitch, and creosote to be coal to products. cyclohexane-extractable fraction See Appendix C See Appendix A				
		TWA	0.2 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants		
		As used in §1910.1000 (Table Z-1), coal tar pitch volatiles include the fused polycyclic hydrocarbons which volatilize from the distillation residues of coal, petroleum (excluding asphalt), wood, and other organic matter. Asphalt (CAS 8052-42-4, and CAS 64742-93-4) is not covered under the 'coal tar pitch volatiles' standard OSHA specifically regulated carcinogen				
		TWA	0.1 mg/m3	USA. NIOSH Recommended Exposure Limits		
		Potential Occupational Carcinogen NIOSH considers coal tar, coal tar pitch, and creosote to be coal tar products. cyclohexane-extractable fraction See Appendix C See Appendix A				
		TWA	0.2 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000		
		PEL	0.2 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)		
		PEL	0.2 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)		

Biological occupational exposure limits

3						
Component	CAS-No.	Parameters	Value	Biological	Basis	

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		specimen		
-	1- Hydroxypyren e	Urine	ACGIH - Biological Exposure Indices (BEI)	
Remarks	End of shift at end of workweek			
	1- Hydroxypyren e	Urine	ACGIH - Biological Exposure Indices (BEI)	
	End of shift at end of workweek			

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance Form: solid

b) Odour No data available

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Odour Threshold No data available c) d) рΗ No data available

Melting point/freezing e)

point

Melting point/range: 177 - 180 °C (351 - 356 °F)

Initial boiling point and f)

boiling range

495 °C (923 °F)

Flash point No data available No data available h) Evaporation rate

Flammability (solid, gas) No data available

Upper/lower j) flammability or explosive limits No data available

k) Vapour pressure No data available I) Vapour density No data available m) Relative density 1.35 g/cm3

n) Water solubility No data available o) Partition coefficient: nlog Pow: 5.97 octanol/water

p) Auto-ignition temperature

No data available

Decomposition temperature

No data available

Viscosity No data available r) s) Explosive properties No data available 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

Conditions to avoid 10.4

No data available

10.5 Incompatible materials

Strong oxidizing agents

10.6 **Hazardous decomposition products**

Hazardous decomposition products formed under fire conditions. - Carbon oxides

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

No data available

Supelco - 48564 Page 6 of 9 Inhalation: No data available

Dermal: No data available

LD50 Subcutaneous - Rat - 50 mg/kg

Skin corrosion/irritation

Skin - Mouse

Result: Mild skin irritation

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

Chronic exposure may cause dermatitis.

Germ cell mutagenicity

May alter genetic material.

In vivo tests showed mutagenic effects

Carcinogenicity

This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Possible human carcinogen

IARC: 1 - Group 1: Carcinogenic to humans (Benzo[a]pyrene)

NTP: RAHC - Reasonably anticipated to be a human carcinogen (Benzo[a]pyrene)

OSHA: OSHA specifically regulated carcinogen (Benzo[a]pyrene)

Reproductive toxicity

May cause congenital malformation in the fetus.

Presumed human reproductive toxicant

May cause reproductive disorders.

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: Not available

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to daphnia and

EC50 - Daphnia magna (Water flea) - 0.25 mg/l - 48 h

other aquatic invertebrates

Toxicity to algae EC50 - Pseudokirchneriella subcapitata (green algae) - 0.02 mg/l - 72 h

12.2 Persistence and degradability

12.3 Bioaccumulative potential

Bioaccumulation Lepomis macrochirus (Bluegill) - 48 h

- 0.0005 mg/l

Bioconcentration factor (BCF): 3,208

12.4 Mobility in soil

No data available

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12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 3077 Class: 9 Packing group: III

Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (Benzo[a]pyrene)

Reportable Quantity (RQ): 1 lbs Poison Inhalation Hazard: No

IMDG

UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F

Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Benzo[a]pyrene)

Marine pollutant:yes

IATA

UN number: 3077 Class: 9 Packing group: III

Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Benzo[a]pyrene)

Further information

EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

 CAS-No.
 Revision Date

 Benzo[a]pyrene
 50-32-8
 2007-03-01

SARA 311/312 Hazards

Acute Health Hazard. Chronic Health Hazard

Massachusetts Right To Know Components

 CAS-No.
 Revision Date

 Benzo[a]pyrene
 50-32-8
 2007-03-01

Pennsylvania Right To Know Components

Benzo[a]pyrene CAS-No. Revision Date 50-32-8 2007-03-01

Benzo[a]pyrene CAS-No. Revision Date 50-32-8 2007-03-01

New Jersey Right To Know Components

CAS-No. Revision Date

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Benzo[a]pyrene 50-32-8 2007-03-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer. CAS-No. Revision Date 1990-01-01

Benzo[a]pyrene

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute Acute aquatic toxicity
Aquatic Chronic Chronic aquatic toxicity

Carc. Carcinogenicity

H317 May cause an allergic skin reaction.

H340 May cause genetic defects.

H350 May cause cancer.

H360 May damage fertility or the unborn child.

H400 Very toxic to aquatic life.

H410 Very toxic to aquatic life with long lasting effects.

Muta. Germ cell mutagenicity

HMIS Rating

Health hazard: 3
Chronic Health Hazard: *
Flammability: 0
Physical Hazard 0

NFPA Rating

Health hazard: 3
Fire Hazard: 0
Reactivity Hazard: 0

Further information

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Preparation Information

Sigma-Aldrich Corporation Product Safety – Americas Region 1-800-521-8956

Version: 5.8 Revision Date: 02/02/2018 Print Date: 10/19/2018

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SAFETY DATA SHEET

Version 6.1 Revision Date 07/17/2018 Print Date 01/21/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Benzo[<|>b</>|fluoranthene

Product Number : 48490 Brand : Supelco Index-No. : 601-034-00-4

CAS-No. : 205-99-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.

3050 Spruce Street ST. LOUIS MO 63103 UNITED STATES

Telephone : +1 314 771-5765 Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Carcinogenicity (Category 1B), H350

Acute aquatic toxicity (Category 1), H400

Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H350 May cause cancer.

H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201 Obtain special instructions before use.

P202 Do not handle until all safety precautions have been read and

understood.

P273 Avoid release to the environment.

P281 Use personal protective equipment as required.

P308 + P313 IF exposed or concerned: Get medical advice/ attention.

P391 Collect spillage. P405 Store locked up.

P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : 3,4-Benzofluoranthene

Formula : C<SB>20</>H<SB>12</>

Molecular weight : 252.31 g/mol CAS-No. : 205-99-2 EC-No. : 205-911-9 Index-No. : 601-034-00-4

Hazardous components

Component	Classification	Concentration
Benz[e]acephenanthrylene		
	Carc. 1B; Aquatic Acute 1; Aquatic Chronic 1; H350, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Supelco- 48490 Page 2 of 8

5.2 Special hazards arising from the substance or mixture

Carbon oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust. For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid formation of dust and aerosols. Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.

Provide appropriate exhaust ventilation at places where dust is formed.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Recommended storage temperature 2 - 8 °C

Storage class (TRGS 510): 6.1D: Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Remarks	Cancer Substances for which there is a Biological Exposure Index or Indices (see BEI® section), see BEI® for Polycyclic Aromatic Hydrocarbons
	(PAHs) Exposure by all routes should be carefully controlled to levels as low
	as possible. Suspected human carcinogen

Biological occupational exposure limits

biological occupational exposure limits					
Component	CAS-No.	Parameters	Value	Biological	Basis
				specimen	
Benz[e]acephenant hrylene	205-99-2	1- Hydroxypyren e		Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift at end of workweek			

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8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method:

EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance Form: solid

b) Odourc) Odour Thresholdd) pHNo data availableNo data available

e) Melting point/freezing Melting point/range: 163 - 165 °C (325 - 329 °F) - lit.

point

f) Initial boiling point and No data available

boiling range

g) Flash point No data available
h) Evaporation rate No data available
i) Flammability (solid, gas) No data available

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Upper/lower No data available i) flammability or explosive limits k) Vapour pressure No data available Vapour density No data available m) Relative density No data available n) Water solubility No data available o) Partition coefficient: n-No data available octanol/water p) Auto-ignition No data available temperature q) Decomposition No data available temperature r) Viscosity No data available s) Explosive properties No data available

9.2 Other safety information

Oxidizing properties

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides

No data available

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

TDLo Oral - Mouse - 7.57 mg/kg

Remarks: Liver: Changes in liver weight. Endocrine: Changes in thymus weight.

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

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Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Possible human carcinogen

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Benz[e]acephenanthrylene)

NTP: RAHC - Reasonably anticipated to be a human carcinogen (Benz[e]acephenanthrylene)

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's

list of regulated carcinogens.

Reproductive toxicity

No data available No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: Not available

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to daphnia and other aquatic lmmobilization EC50 - Daphnia magna (Water flea) - > 1.024 mg/l - 24 h(Benz[e]acephenanthrylene)

invertebrates

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available(Benz[e]acephenanthrylene)

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Very toxic to aquatic life.

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13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

Not dangerous goods

IMDG

UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.

(Benz[e]acephenanthrylene)

Marine pollutant : yes

IATA

UN number: 3077 Class: 9 Packing group: III

Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Benz[e]acephenanthrylene)

Further information

EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

CAS-No. Revision Date

Benz[e]acephenanthrylene 205-99-2 2007-03-01

SARA 311/312 Hazards

Chronic Health Hazard

Massachusetts Right To Know Components

CAS-No. Revision Date Benz[e]acephenanthrylene 205-99-2 2007-03-01

Pennsylvania Right To Know Components

Benz[e]acephenanthrylene CAS-No. Revision Date 205-99-2 2007-03-01

California Prop. 65 Components

, which is/are known to the State of California to cause cancer. CAS-No. Revision Date For more information go to www.P65Warnings.ca.gov. 205-99-2 2007-09-28

Benz[e]acephenanthrylene

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

H350 May cause cancer.

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H400 Very toxic to aquatic life.

H410 Very toxic to aquatic life with long lasting effects.

Further information

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Preparation Information

Sigma-Aldrich Corporation Product Safety – Americas Region 1-800-521-8956

Version: 6.1 Revision Date: 07/17/2018 Print Date: 01/21/2019

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SAFETY DATA SHEET

Version 6.1 Revision Date 07/16/2018 Print Date 01/21/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Benzo[<I>k</>]fluoranthene

Product Number : 48492 Brand : Supelco Index-No. : 601-036-00-5

CAS-No. : 207-08-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.

3050 Spruce Street ST. LOUIS MO 63103 UNITED STATES

Telephone : +1 314 771-5765 Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Carcinogenicity (Category 1B), H350

Acute aquatic toxicity (Category 1), H400

Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H350 May cause cancer.

H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201 Obtain special instructions before use.

P202 Do not handle until all safety precautions have been read and

understood.

P273 Avoid release to the environment.

P281 Use personal protective equipment as required.

P308 + P313 IF exposed or concerned: Get medical advice/ attention.

P391 Collect spillage. P405 Store locked up.

P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula : C<SB>20</>H<SB>12</>

Molecular weight : 252.31 g/mol CAS-No. : 207-08-9 EC-No. : 205-916-6 Index-No. : 601-036-00-5

Hazardous components

Component	Classification	Concentration
Benzo[k]fluoranthene		
	Carc. 1B; Aquatic Acute 1; Aquatic Chronic 1; H350, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Supelco- 48492 Page 2 of 8

5.2 Special hazards arising from the substance or mixture

Carbon oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid formation of dust and aerosols. Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.

Provide appropriate exhaust ventilation at places where dust is formed.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Recommended storage temperature 2 - 8 °C

Storage class (TRGS 510): 6.1D: Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Biological occupational exposure limits

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Component	CAS-No.	Parameters	Value	Biological specimen	Basis	
Benzo[k]fluoranthen e	207-08-9	1- Hydroxypyren e		Urine	ACGIH - Biological Exposure Indices (BEI)	
	Remarks	End of shift at	end of worky	week		

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).

Supelco- 48492 Page 3 of 8

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method:

EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance Form: crystalline

Colour: yellow

b) Odourc) Odour Thresholdd) pHNo data availableNo data available

e) Melting point/freezing

point

Melting point/range: 215 - 217 °C (419 - 423 °F) - lit.

f) Initial boiling point and

boiling range

No data available

g) Flash point No data availableh) 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 availablel) Vapour density No data available

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m) Relative density No data available n) Water solubility No data available o) Partition coefficient: n-No data available

octanol/water

p) Auto-ignition temperature

No data available

q) Decomposition temperature

No data available

Viscosity No data available r) s) Explosive properties No data available Oxidizing properties No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents

10.6 **Hazardous decomposition products**

Hazardous decomposition products formed under fire conditions. - Carbon oxides

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

No data available

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

Carcinogenicity- Rat- Implant

Supelco- 48492 Page 5 of 8 This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Possible human carcinogen

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Benzo[k]fluoranthene)

NTP: RAHC - Reasonably anticipated to be a human carcinogen (Benzo[k]fluoranthene)

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's

list of regulated carcinogens.

Reproductive toxicity

No data available No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: DF6350000

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(Benzo[k]fluoranthene)

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 3077 Class: 9 Packing group: III

Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Benzo[k]fluoranthene)

Supelco- 48492

Reportable Quantity (RQ) 5000 lbs

nο

Poison Inhalation Hazard: No

IMDG

UN number: 3077 EMS-No: F-A. S-F Class: 9 Packing group: III

Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Benzo[k]fluoranthene)

Marine pollutant : yes

IATA

UN number: 3077 Class: 9 Packing group: III

Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Benzo[k]fluoranthene)

Further information

EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Benzo[k]fluoranthene	207-08-9	1994-04-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Benzo[k]fluoranthene	207-08-9	1994-04-01

California Prop. 65 Components

, which is/are known to the State of California to cause cancer.	CAS-No.	Revision Date
For more information go to www.P65Warnings.ca.gov.	207-08-9	2007-09-28
Renzo[k]fluoranthene		

Benzolklinorantnene

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

H350 May cause cancer. H400 Very toxic to aquatic life.

H410 Very toxic to aquatic life with long lasting effects.

Further information

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Preparation Information

Sigma-Aldrich Corporation Product Safety – Americas Region 1-800-521-8956

Version: 6.1 Revision Date: 07/16/2018 Print Date: 01/21/2019

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SAFETY DATA SHEET

Version 6.0 Revision Date 02/08/2019 Print Date 06/29/2019

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : BENZO(G,H,I)PERYLENE, 98%

Product Number : B9009
Brand : Aldrich
CAS-No. : 191-24-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.

3050 Spruce Street ST. LOUIS MO 63103

UNITED STATES

Telephone : +1 314 771-5765 Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Short-term (acute) aquatic hazard (Category 1), H400 Long-term (chronic) aquatic hazard (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)

H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P273 Avoid release to the environment.

P391 Collect spillage.

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plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms : 1,12-Benzoperylene

Formula : C₂₂H₁₂

Molecular weight : 276.33 g/mol
CAS-No. : 191-24-2
EC-No. : 205-883-8

Component	Classification	Concentration			
Benzo[ghi]perylene Included in the Candidate List of Substances of Very High Concern (SVHC) according to Regulation (EC) No. 1907/2006 (REACH)					
	Aquatic Acute 1; Aquatic Chronic 1; H400, H410 M-Factor - Aquatic Acute: 1,000 - Aquatic Chronic: 1,000	<= 100 %			

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

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SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.

Provide appropriate exhaust ventilation at places where dust is formed.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Storage class (TRGS 510): 13: Non Combustible Solids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

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Component	CAS-No.	Value	Control	Basis
			parameters	
Benzo[ghi]perylen e	191-24-2	PEL	0.2 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
	Remarks	Coal tar pitch volatiles (benzene or cyclohexane-soluble fraction) include fused polycyclic hydrocarbons (some of which are known carcinogens) which volatilize from the distillation residues of coal, petroleum (excluding asphalt) wood, and other organic matter. Asphalt (CAS 8052-42-4 and CAS 64742-93-4) is not covered under the 'coal tar pitch volatiles' standard.		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Benzo[ghi]peryle ne	191-24-2	1- Hydroxypyr ene	2.5 µg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift a	End of shift at end of workweek		
		3- hydroxyben zo(a)pyrene		Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift at end of workweek			

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

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)

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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

Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

Information on basic physical and chemical properties

Form: solid a) Appearance

b) Odour No data available c) Odour Threshold No data available

d) pH No data available

Melting point/range: 277 - 279 °C (531 - 534 °F) - lit. e) Melting point/freezing point

Initial boiling point $> 500 \, ^{\circ}\text{C} > 932 \, ^{\circ}\text{F} - \text{lit.}$ and boiling range

g) Flash point ()No data available h) Evaporation rate No data available No data available

Flammability (solid, gas)

Upper/lower No data available j)

flammability or explosive limits

k) Vapour pressure No data available I) Vapour density No data available m) Relative density No data available

n) Water solubility insoluble

o) Partition coefficient: log Pow: 6.22 at 25 °C (77 °F)

n-octanol/water

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p) Auto-ignition No data available

temperature

q) Decomposition No data available temperature

r) Viscosity No data availables) Explosive properties No data availablet) Oxidizing properties No data available

9.2 Other safety information

No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides Other decomposition products - No data available

In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

No data available

Inhalation: No data available Dermal: No data available

No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

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Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: No component of this product present at levels greater than or equal to 0.1% is

identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is

identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is

on OSHA's list of regulated carcinogens.

Reproductive toxicity

No data available No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: Not available

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

No data available

Toxicity to daphnia and other aquatic invertebrates

static test EC50 - Daphnia magna (Water flea) - 0.0002 mg/l - 48 h

Growth rate EC10 - Pseudokirchneriella subcapitata (green algae) - >

Toxicity to algae Growth rate EC10 - 0.0016 mg/l - 72 h

12.2 Persistence and degradability

Biodegradability Result: - Not rapidly biodegradable

Remarks: No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

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12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic life with long lasting effects.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

SECTION 14: Transport information

DOT (US)

Not dangerous goods

IMDG

UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.

(Benzo[ghi]perylene) Marine pollutant : yes

IATA

UN number: 3077 Class: 9 Packing group: III

Proper shipping name: Environmentally hazardous substance, solid, n.o.s.

(Benzo[ghi]perylene) **Further information**

EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

SECTION 15: Regulatory information

SARA 302 Components

This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

Benzo[ghi]perylene CAS-No. Revision Date 2015-11-23

SARA 311/312 Hazards

No SARA Hazards

Massachusetts Right To Know Components

Benzo[ghi]perylene CAS-No. Revision Date 2015-11-23

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Pennsylvania Right To Know Components

Benzo[ghi]perylene CAS-No. Revision Date 191-24-2 2015-11-23

California Prop. 65 Components

, which is/are known to the State of California to CAS-No. Revision Date cause cancer. For more information go to 191-24-2 2007-09-28 www.P65Warnings.ca.gov.Benzo[ghi]perylene

SECTION 16: Other information

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.0 Revision Date: 02/08/2019 Print Date: 06/29/2019

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SAFETY DATA SHEET

Version 6.1 Revision Date 07/17/2018 Print Date 01/21/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Benz[a]anthracene

Product Number : 48563 Brand : Supelco Index-No. : 601-033-00-9

CAS-No. : 56-55-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.

3050 Spruce Street ST. LOUIS MO 63103 UNITED STATES

Telephone : +1 314 771-5765 Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Carcinogenicity (Category 1B), H350

Acute aquatic toxicity (Category 1), H400

Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H350 May cause cancer.

H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201 Obtain special instructions before use.

P202 Do not handle until all safety precautions have been read and

understood.

P273 Avoid release to the environment.

P281 Use personal protective equipment as required.

P308 + P313 IF exposed or concerned: Get medical advice/ attention.

P391 Collect spillage. P405 Store locked up.

P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : 1,2-Benzanthracene

Tetraphene

Formula : C<SB>18</>H<SB>12</>

 Molecular weight
 : 228.29 g/mol

 CAS-No.
 : 56-55-3

 EC-No.
 : 200-280-6

 Index-No.
 : 601-033-00-9

Hazardous components

Component	Classification	Concentration
Benz[a]anthracene		
	Carc. 1B; Aquatic Acute 1; Aquatic Chronic 1; H350, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust. For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid formation of dust and aerosols. Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.

Provide appropriate exhaust ventilation at places where dust is formed.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Store at room temperature.

Storage class (TRGS 510): 6.1D: Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

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).

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Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method:

EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance Form: solid

b) Odourc) Odour Thresholdd) pHNo data availableNo data available

e) Melting point/freezing Melting point/range: 157 - 159 °C (315 - 318 °F)

point

f) Initial boiling point and 437.6 °C (819.7 °F)

boiling range

g) Flash point No data available
h) Evaporation rate No data available
i) Flammability (solid, gas) No data available
j) Upper/lower No data available

flammability or explosive limits

k) Vapour pressure No data availablel) Vapour density No data availablem) Relative density No data available

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n) Water solubility No data available
 o) Partition coefficient: n- No data available octanol/water

p) Auto-ignition No data available temperature

q) Decomposition No data available temperature

r) Viscosity No data available
 s) Explosive properties No data available
 t) Oxidizing properties No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

No data available

Inhalation: No data available Dermal: No data available

LD50 Intravenous - Rat - > 200 mg/kg

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Possible human carcinogen

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IARC: 2B - Group 2B: Possibly carcinogenic to humans (Benz[a]anthracene)

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Benz[a]anthracene)

NTP: RAHC - Reasonably anticipated to be a human carcinogen (Benz[a]anthracene)

NTP: RAHC - Reasonably anticipated to be a human carcinogen (Benz[a]anthracene)

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's

list of regulated carcinogens.

No component of this product present at levels greater than or equal to 0.1% is on OSHA's

list of regulated carcinogens.

Reproductive toxicity

No data available No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: Not available

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(Benz[a]anthracene)

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

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14. TRANSPORT INFORMATION

DOT (US)

Not dangerous goods

IMDG

UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F

Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Benz[a]anthracene)

Marine pollutant : yes

IATA

UN number: 3077 Class: 9 Packing group: III

Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Benz[a]anthracene)

Further information

EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Chronic Health Hazard

·	CAS-No.	Revision Date
Benz[a]anthracene	56-55-3	1993-04-24
Pennsylvania Right To Know Components		
	CAS-No.	Revision Date
Benz[a]anthracene	56-55-3	1993-04-24
	CAS-No.	Revision Date
Benz[a]anthracene	56-55-3	1993-04-24
New Jersey Right To Know Components		
	CAS-No.	Revision Date
Benz[a]anthracene	56-55-3	1993-04-24
California Prop. 65 Components		
WARNING! This product contains a chemical known to the	CAS-No.	Revision Date
State of California to cause cancer. Benz[a]anthracene	56-55-3	2007-09-28
WARNING! This product contains a chemical known to the	CAS-No.	Revision Date
State of California to cause cancer. Benz[a]anthracene	56-55-3	2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

H350	May cause cancer.
H400	Very toxic to aquatic life.

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H410 Very toxic to aquatic life with long lasting effects.

Further information

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Preparation Information

Sigma-Aldrich Corporation Product Safety – Americas Region 1-800-521-8956

Version: 6.1 Revision Date: 07/17/2018 Print Date: 01/21/2019

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SAFETY DATA SHEET

Version 4.8 Revision Date 01/11/2018 Print Date 06/28/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Beryllium

Product Number : 378135 Brand : Aldrich

CAS-No. : 7440-41-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich

3050 Spruce Street

SAINT LOUIS MO 63103

USA

Telephone : +1 800-325-5832 Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +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 3), H301

Acute toxicity, Inhalation (Category 2), H330

Skin irritation (Category 2), H315 Eye irritation (Category 2A), H319 Skin sensitisation (Category 1), H317

Carcinogenicity (Category 1B), H350

Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335

Specific target organ toxicity - repeated exposure (Category 1), H372

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)

H301 Toxic if swallowed. H315 Causes skin irritation.

H317 May cause an allergic skin reaction.
H319 Causes serious eye irritation.

H330 Fatal if inhaled.

H335 May cause respiratory irritation.

H350 May cause cancer.

H372 Causes damage to organs through prolonged or repeated exposure.

Precautionary statement(s) P201 Obtain special instructions before use. P202 Do not handle until all safety precautions have been read and understood. P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray. Wash skin thoroughly after handling. P264 Do not eat, drink or smoke when using this product. P270 P271 Use only outdoors or in a well-ventilated area. P272 Contaminated work clothing should not be allowed out of the workplace. Wear protective gloves/ protective clothing/ eye protection/ face P280 protection. P284 Wear respiratory protection. P301 + P310 + P330 IF SWALLOWED: Immediately call a POISON CENTER/doctor. Rinse IF ON SKIN: Wash with plenty of soap and water. P302 + P352 P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/doctor. IF IN EYES: Rinse cautiously with water for several minutes. Remove P305 + P351 + P338 contact lenses, if present and easy to do. Continue rinsing. IF exposed or concerned: Get medical advice/ attention. P308 + P313 P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention. P337 + P313 If eye irritation persists: Get medical advice/ attention. P362 Take off contaminated clothing and wash before reuse. P403 + P233 Store in a well-ventilated place. Keep container tightly closed.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

Store locked up.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

P405

P501

Formula : Be

Molecular weight : 9.01 g/mol CAS-No. : 7440-41-7 EC-No. : 231-150-7

Hazardous components

Component	Classification	Concentration
Berylium foil		
	Acute Tox. 3; Acute Tox. 2;	90 - 100 %
	Skin Irrit. 2; Eye Irrit. 2A; Skin	
	Sens. 1; Carc. 1B; STOT SE	
	3; STOT RE 1; H301, H315,	
	H317, H319, H330, H335,	
	H350, H372	

Dispose of contents/ container to an approved waste disposal plant.

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

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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

Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation.

Evacuate personnel to safe areas. Avoid breathing dust.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.

Provide appropriate exhaust ventilation at places where dust is formed.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Keep in a dry place.

Storage class (TRGS 510): 4.1B: Flammable solid hazardous materials

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control	Basis	
			parameters		
Berylium foil	7440-41-7	TWA	2.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-2	
		CEIL	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-2	
		Peak	25.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-2	
		TWA	2.000000microg ram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2	
	Remarks	Z27.29-1970		<u> </u>	
	rtemante	CEIL	5.000000microg ram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2	
		Z27.29-1970			
		Peak	25.000000micro gram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2	
		Z27.29-1970			
		TWA	0.000050 mg/m3	USA. ACGIH Threshold Limit Values (TLV)	
		Beryllium sensitization Chronic beryllium disease (berylliosis) Confirmed human carcinogen Danger of cutaneous absorption		,	
		Sensitizer C	0.000500	USA. NIOSH Recommended	
		Potential Oc	mg/m3 cupational Carcino	Exposure Limits	
		Potential Occupational Carcinogen See Appendix A		9	
		See Table Z			
		TWA	2.000000microg ram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2	
		Z27.29-1970			
		TWA	2.000000microg ram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2	
		Z27.29-1970			
		CEIL	5.000000microg ram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2	
		Z27.29-1970			
		CEIL	5.000000microg ram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2	
		Z27.29-1970			
		Peak	25.000000micro gram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2	
		Z27.29-1970			
		Peak	25.000000micro gram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2	
		Z27.29-1970			
		TWA	0.000050 mg/m3	USA. ACGIH Threshold Limit Values (TLV)	
			Beryllium sensitization Chronic beryllium disease (berylliosis)		

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1					
		Adopted values or notations enclosed are those for which changes			
		are proposed in the NIC			
		See Notice of Intended Changes (NIC)			
	Confirmed	Confirmed human carcinogen			
	Danger of	Danger of cutaneous absorption			
	Sensitizer	Sensitizer			
	С	0.000500	USA. NIOSH Recommended		
		mg/m3	Exposure Limits		
	Potential (Potential Occupational Carcinogen			
		See Appendix A			
		See Table Z-2			
	TWA	2microgram per	USA. Occupational Exposure Limits		
		cubic meter	(OSHA) - Table Z-2		
	Z27.29-19	Z27.29-1970			
	CEIL	5microgram per	USA. Occupational Exposure Limits		
		cubic meter	(OSHA) - Table Z-2		
	Z27.29-19	Z27.29-1970			
	Peak	25microgram	USA. Occupational Exposure Limits		
		per cubic meter	(OSHA) - Table Z-2		
	Z27.29-19	9-1970			
	С	0.0005 mg/m3	USA. NIOSH Recommended		
			Exposure Limits		
	Potential	ential Occupational Carcinogen Appendix A			
	PEL	0.0002 mg/m3	California permissible exposure		
			limits for chemical contaminants		
			(Title 8, Article 107)		
	С	0.025 mg/m3	California permissible exposure		
		J. J. J.	limits for chemical contaminants		
			(Title 8, Article 107)		

8.2 Exposure controls

Appropriate engineering controls

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an

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industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance Form: powder

Colour: grey

Odour odourless

Odour Threshold No data available c) No data available d) pН

Melting point/freezing e)

point

Melting point/range: 1,278 °C (2,332 °F) - lit.

Initial boiling point and

boiling range

2,970 °C (5,378 °F) - lit.

g) Flash point No data available Evaporation rate No data available Flammability (solid, gas) No data available i)

Upper/lower flammability or explosive limits No data available

Vapour pressure No data available Vapour density No data available

m) Relative density 1.85 g/cm3 at 25 °C (77 °F)

n) Water solubility No data available Partition coefficient: n-No data available

octanol/water

No data available

p) Auto-ignition temperature Decomposition

No data available

temperature

No data available

r) Viscosity No data available Explosive properties Oxidizing properties No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

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10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Alkali metals

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Beryllium oxides

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

No data available

Inhalation: No data available

Dermal: No data available

LD50 Intravenous - Rat - 0.496 mg/kg

Remarks: Liver: Hepatitis (hepatocellular necrosis), zonal.

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

Hamster Lungs

Result: negative

Carcinogenicity

Carcinogenicity - Rat - Intratracheal

Tumorigenic:Neoplastic by RTECS criteria. Lungs, Thorax, or Respiration:Tumors. Lungs, Thorax, or Respiration:Bronchiogenic carcinoma.

Carcinogenicity - Rabbit - Intravenous

Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Musculoskeletal:Tumors.

Possible human carcinogen

IARC: 1 - Group 1: Carcinogenic to humans (Berylium foil)

NTP: Known - Known to be human carcinogen (Berylium foil)

Known - Known to be human carcinogenThe reference note has been added by TD based on

the background information of the NTP. (Berylium foil)

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's

list of regulated carcinogens.

Reproductive toxicity

No data available

No data available

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Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: DS1750000

12. ECOLOGICAL INFORMATION

12.1 Toxicity

No data available

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1567 Class: 6.1 (4.1) Packing group: II

Proper shipping name: Beryllium, powder

Reportable Quantity (RQ): 10 lbs Poison Inhalation Hazard: No

IMDG

UN number: 1567 Class: 6.1 (4.1) Packing group: II EMS-No: F-G, S-G

Proper shipping name: BERYLLIUM POWDER

IATA

UN number: 1567 Class: 6.1 (4.1) Packing group: II

Proper shipping name: Beryllium powder

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

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The following components are subject to reporting levels established by SARA Title III, Section 313:

Berylium foil CAS-No. Revision Date 7440-41-7 1993-04-24

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

Berylium foil CAS-No. Revision Date 7440-41-7 1993-04-24

Pennsylvania Right To Know Components

Berylium foil CAS-No. Revision Date 7440-41-7 1993-04-24

Berylium foil CAS-No. Revision Date 7440-41-7 1993-04-24

New Jersey Right To Know Components

Berylium foil CAS-No. Revision Date 7440-41-7 1993-04-24

California Prop. 65 Components

WARNING! This product contains a chemical known to the CAS-No. Revision Date State of California to cause cancer. 7440-41-7 2008-10-10 Berylium foil

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox. Acute toxicity
Carc. Carcinogenicity
Eye Irrit. Eye irritation
H301 Toxic if swallowed.
H315 Causes skin irritation.

H317 May cause an allergic skin reaction.

H319 Causes serious eye irritation.

H330 Fatal if inhaled.

H335 May cause respiratory irritation.

H350 May cause cancer.

H372 Causes damage to organs through prolonged or repeated exposure.

Skin Irrit. Skin irritation
Skin Sens. Skin sensitisation

HMIS Rating

Health hazard: 4
Chronic Health Hazard: *
Flammability: 0
Physical Hazard 0

NFPA Rating

Health hazard: 4
Fire Hazard: 3
Reactivity Hazard: 3

Further information

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Preparation Information Sigma-Aldrich Corporation Product Safety – Americas Region 1-800-521-8956

Revision Date: 01/11/2018 Print Date: 06/28/2019 Version: 4.8

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SAFETY DATA SHEET

Version 6.0 Revision Date 03/14/2018 Print Date 07/18/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : β-BHC

Product Number : 48494
Brand : Supelco
Index-No. : 602-042-00-0

CAS-No. : 319-85-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.

3050 Spruce Street ST. LOUIS MO 63103 UNITED STATES

Telephone : +1 314 771-5765 Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 3), H301

Acute toxicity, Dermal (Category 4), H312

Carcinogenicity (Category 2), H351

Acute aquatic toxicity (Category 1), H400

Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)

H301 Toxic if swallowed.

H312 Harmful in contact with skin.
H351 Suspected of causing cancer.

H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201 Obtain special instructions before use.

P202 Do not handle until all safety precautions have been read and

understood.

P264 Wash skin thoroughly after handling.

P270 Do not eat, drink or smoke when using this product.

P273 Avoid release to the environment.

P280 Wear protective gloves/ protective clothing.
P281 Use personal protective equipment as required.

P301 + P310 + P330 IF SWALLOWED: Immediately call a POISON CENTER/doctor. Rinse

mouth.

P302 + P352 + P312 IF ON SKIN: Wash with plenty of soap and water. Call a POISON

CENTER or doctor/ physician if you feel unwell.

P308 + P313 IF exposed or concerned: Get medical advice/ attention.

P363 Wash contaminated clothing before reuse.

P391 Collect spillage. P405 Store locked up.

P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : β -1,2,3,4,5,6-Hexachlorocyclohexane

Formula : $C_6H_6Cl_6$ Molecular weight : 290.83 g/mol CAS-No. : 319-85-7 EC-No. : 206-271-3 Index-No. : 602-042-00-0

Hazardous components

Component	Classification	Concentration
(1α,2β,3α,4β,5α,6β)-1,2,3,4,5,6-Hexachlorocyclohexa	ne	
	Acute Tox. 3; Acute Tox. 4;	<= 100 %
	Carc. 2; Aquatic Acute 1;	
	Aquatic Chronic 1; H301,	
	H312, H351, H410	

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

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In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.

Provide appropriate exhaust ventilation at places where dust is formed.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Store at room temperature.

Storage class (TRGS 510): 6.1D: Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

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8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method:

EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance Form: solid

Colour: colourless

b) Odourc) Odour Thresholdd) pHNo data availableNo data available

e) Melting point/freezing > 300.0 °C (> 572.0 °F)

point

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f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available

m) Relative density No data available
n) Water solubility insoluble
o) Partition coefficient: n- log Pow: 3.78

octanol/water

p) Auto-ignition No

No data available

temperature q) Decomposition

No data available

temperature r) Viscosity

No data available

s) Explosive properties No data available
t) Oxidizing properties No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 6,000 mg/kg Inhalation: No data available Dermal: No data available No data available

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Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Limited evidence of carcinogenicity in animal studies

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.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a

carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: GV4375000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Blood -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish LC50 - Poecilia reticulata (guppy) - 1.6 mg/l - 96.0 h($(1\alpha,2\beta,3\alpha,4\beta,5\alpha,6\beta)$ -

1,2,3,4,5,6-Hexachlorocyclohexane)

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

Bioaccumulation Cyprinus carpio (Carp) - 35 d

- 0.05 mg/l($(1\alpha,2\beta,3\alpha,4\beta,5\alpha,6\beta)$ -1,2,3,4,5,6-Hexachlorocyclohexane)

Bioconcentration factor (BCF): 500

12.4 Mobility in soil

No data available($(1\alpha,2\beta,3\alpha,4\beta,5\alpha,6\beta)$ -1,2,3,4,5,6-Hexachlorocyclohexane)

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

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13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 2811 Class: 6.1 Packing group: III

Proper shipping name: Toxic solids, organic, n.o.s. $((1\alpha,2\beta,3\alpha,4\beta,5\alpha,6\beta)-1,2,3,4,5,6-\text{Hexachlorocyclohexane})$

Reportable Quantity (RQ) : 1 lbs

noMarine pollutant: no Poison Inhalation Hazard: No

IMDG

UN number: 2811 Class: 6.1 Packing group: III EMS-No: F-A, S-A

Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. ((1α,2β,3α,4β,5α,6β)-1,2,3,4,5,6-Hexachlorocyclohexane)

IATA

UN number: 2811 Class: 6.1 Packing group: III

Proper shipping name: Toxic solid, organic, n.o.s. $((1\alpha,2\beta,3\alpha,4\beta,5\alpha,6\beta)-1,2,3,4,5,6$ -Hexachlorocyclohexane)

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Acute Health Hazard. Chronic Health Hazard

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.

CAS-No. Revision Date 319-85-7

 $(1\alpha,2\beta,3\alpha,4\beta,5\alpha,6\beta)$ -1,2,3,4,5,6-Hexachlorocyclohexane

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

H301	Toxic if swallowed.
H312	Harmful in contact with skin.
H351	Suspected of causing cancer.
H400	Very toxic to aquatic life.

H410 Very toxic to aquatic life with long lasting effects.

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HMIS Rating

Health hazard: 2
Chronic Health Hazard: *
Flammability: 0
Physical Hazard 0

NFPA Rating

Health hazard: 1
Fire Hazard: 0
Reactivity Hazard: 0

Further information

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Preparation Information

Sigma-Aldrich Corporation Product Safety – Americas Region 1-800-521-8956

Version: 6.0 Revision Date: 03/14/2018 Print Date: 07/18/2019

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SAFETY DATA SHEET

Version 4.8 Revision Date 01/11/2018 Print Date 06/28/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Beryllium

Product Number : 378135 Brand : Aldrich

CAS-No. : 7440-41-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich

3050 Spruce Street

SAINT LOUIS MO 63103

USA

Telephone : +1 800-325-5832 Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +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 3), H301

Acute toxicity, Inhalation (Category 2), H330

Skin irritation (Category 2), H315 Eye irritation (Category 2A), H319 Skin sensitisation (Category 1), H317

Carcinogenicity (Category 1B), H350

Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335

Specific target organ toxicity - repeated exposure (Category 1), H372

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)

H301 Toxic if swallowed. H315 Causes skin irritation.

H317 May cause an allergic skin reaction.
H319 Causes serious eye irritation.

H330 Fatal if inhaled.

H335 May cause respiratory irritation.

H350 May cause cancer.

H372 Causes damage to organs through prolonged or repeated exposure.

Precautionary statement(s) P201 Obtain special instructions before use. P202 Do not handle until all safety precautions have been read and understood. P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray. Wash skin thoroughly after handling. P264 Do not eat, drink or smoke when using this product. P270 P271 Use only outdoors or in a well-ventilated area. P272 Contaminated work clothing should not be allowed out of the workplace. Wear protective gloves/ protective clothing/ eye protection/ face P280 protection. P284 Wear respiratory protection. P301 + P310 + P330 IF SWALLOWED: Immediately call a POISON CENTER/doctor. Rinse IF ON SKIN: Wash with plenty of soap and water. P302 + P352 P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/doctor. IF IN EYES: Rinse cautiously with water for several minutes. Remove P305 + P351 + P338 contact lenses, if present and easy to do. Continue rinsing. IF exposed or concerned: Get medical advice/ attention. P308 + P313 P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention. P337 + P313 If eye irritation persists: Get medical advice/ attention. P362 Take off contaminated clothing and wash before reuse. P403 + P233 Store in a well-ventilated place. Keep container tightly closed.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

Store locked up.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

P405

P501

Formula : Be

Molecular weight : 9.01 g/mol CAS-No. : 7440-41-7 EC-No. : 231-150-7

Hazardous components

Component	Classification	Concentration
Berylium foil		
	Acute Tox. 3; Acute Tox. 2;	90 - 100 %
	Skin Irrit. 2; Eye Irrit. 2A; Skin	
	Sens. 1; Carc. 1B; STOT SE	
	3; STOT RE 1; H301, H315,	
	H317, H319, H330, H335,	
	H350, H372	

Dispose of contents/ container to an approved waste disposal plant.

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

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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

Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation.

Evacuate personnel to safe areas. Avoid breathing dust.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.

Provide appropriate exhaust ventilation at places where dust is formed.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Keep in a dry place.

Storage class (TRGS 510): 4.1B: Flammable solid hazardous materials

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control	Basis
			parameters	
Berylium foil	7440-41-7	TWA	2.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		CEIL	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Peak	25.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		TWA	2.000000microg ram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
	Remarks	Z27.29-1970		
	rtemante	CEIL	5.000000microg ram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970		
		Peak	25.000000micro gram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970		
		TWA	0.000050 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Confirmed h	nsitization disease (berguman carcinogen utaneous absorptio	,
		Sensitizer C	0.000500	USA. NIOSH Recommended
			mg/m3	Exposure Limits
		See Append	cupational Carcino	gen
		See Table Z		
		TWA	2.000000microg ram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970		
		TWA	2.000000microg ram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970)	
		CEIL	5.000000microg ram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970		
		CEIL	5.000000microg ram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970		
		Peak	25.000000micro gram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970	·	
		Peak	25.000000micro gram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970		
		TWA	0.000050 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Beryllium se Chronic bery	nsitization ⁄llium disease (ber	ylliosis)

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1	1			
		Adopted values or notations enclosed are those for which changes		
		are proposed in the NIC		
		See Notice of Intended Changes (NIC)		
	Confirmed	d human carcinogen		
	Danger of	cutaneous absorptio	n	
	Sensitizer	Sensitizer		
	С	0.000500	USA. NIOSH Recommended	
		mg/m3	Exposure Limits	
	Potential (Occupational Carcino	ogen	
	See Appe			
	See Table			
	TWA	2microgram per	USA. Occupational Exposure Limits	
		cubic meter	(OSHA) - Table Z-2	
	Z27.29-19	Z27.29-1970		
	CEIL	5microgram per	USA. Occupational Exposure Limits	
		cubic meter	(OSHA) - Table Z-2	
	Z27.29-19	970		
	Peak	25microgram	USA. Occupational Exposure Limits	
		per cubic meter	(OSHA) - Table Z-2	
	Z27.29-19	970	,	
	С	0.0005 mg/m3	USA. NIOSH Recommended	
			Exposure Limits	
	Potential (Occupational Carcino	ogen	
	See Appe			
	PEL	0.0002 mg/m3	California permissible exposure	
			limits for chemical contaminants	
			(Title 8, Article 107)	
	С	0.025 mg/m3	California permissible exposure	
			limits for chemical contaminants	
			(Title 8, Article 107)	

8.2 Exposure controls

Appropriate engineering controls

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an

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industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance Form: powder

Colour: grey

Odour odourless

Odour Threshold No data available c) No data available d) pН

Melting point/freezing e)

point

Melting point/range: 1,278 °C (2,332 °F) - lit.

Initial boiling point and

boiling range

2,970 °C (5,378 °F) - lit.

g) Flash point No data available Evaporation rate No data available Flammability (solid, gas) No data available i)

Upper/lower flammability or explosive limits No data available

Vapour pressure No data available Vapour density No data available

m) Relative density 1.85 g/cm3 at 25 °C (77 °F)

n) Water solubility No data available Partition coefficient: n-No data available

octanol/water

No data available

p) Auto-ignition temperature Decomposition

No data available

temperature

No data available

r) Viscosity No data available Explosive properties Oxidizing properties No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

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10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Alkali metals

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Beryllium oxides

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

No data available

Inhalation: No data available

Dermal: No data available

LD50 Intravenous - Rat - 0.496 mg/kg

Remarks: Liver: Hepatitis (hepatocellular necrosis), zonal.

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

Hamster Lungs

Result: negative

Carcinogenicity

Carcinogenicity - Rat - Intratracheal

Tumorigenic:Neoplastic by RTECS criteria. Lungs, Thorax, or Respiration:Tumors. Lungs, Thorax, or Respiration:Bronchiogenic carcinoma.

Carcinogenicity - Rabbit - Intravenous

Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Musculoskeletal:Tumors.

Possible human carcinogen

IARC: 1 - Group 1: Carcinogenic to humans (Berylium foil)

NTP: Known - Known to be human carcinogen (Berylium foil)

Known - Known to be human carcinogenThe reference note has been added by TD based on

the background information of the NTP. (Berylium foil)

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's

list of regulated carcinogens.

Reproductive toxicity

No data available

No data available

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Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: DS1750000

12. ECOLOGICAL INFORMATION

12.1 Toxicity

No data available

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1567 Class: 6.1 (4.1) Packing group: II

Proper shipping name: Beryllium, powder

Reportable Quantity (RQ): 10 lbs Poison Inhalation Hazard: No

IMDG

UN number: 1567 Class: 6.1 (4.1) Packing group: II EMS-No: F-G, S-G

Proper shipping name: BERYLLIUM POWDER

IATA

UN number: 1567 Class: 6.1 (4.1) Packing group: II

Proper shipping name: Beryllium powder

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

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The following components are subject to reporting levels established by SARA Title III, Section 313:

Berylium foil CAS-No. Revision Date 7440-41-7 1993-04-24

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

Berylium foil CAS-No. Revision Date 7440-41-7 1993-04-24

Pennsylvania Right To Know Components

Berylium foil CAS-No. Revision Date 7440-41-7 1993-04-24

Berylium foil CAS-No. Revision Date 7440-41-7 1993-04-24

New Jersey Right To Know Components

Berylium foil CAS-No. Revision Date 7440-41-7 1993-04-24

California Prop. 65 Components

WARNING! This product contains a chemical known to the CAS-No. Revision Date State of California to cause cancer. 7440-41-7 2008-10-10 Berylium foil

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox. Acute toxicity
Carc. Carcinogenicity
Eye Irrit. Eye irritation
H301 Toxic if swallowed.
H315 Causes skin irritation.

H317 May cause an allergic skin reaction.

H319 Causes serious eye irritation.

H330 Fatal if inhaled.

H335 May cause respiratory irritation.

H350 May cause cancer.

H372 Causes damage to organs through prolonged or repeated exposure.

Skin Irrit. Skin irritation
Skin Sens. Skin sensitisation

HMIS Rating

Health hazard: 4
Chronic Health Hazard: *
Flammability: 0
Physical Hazard 0

NFPA Rating

Health hazard: 4
Fire Hazard: 3
Reactivity Hazard: 3

Further information

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Preparation Information Sigma-Aldrich Corporation Product Safety – Americas Region 1-800-521-8956

Revision Date: 01/11/2018 Print Date: 06/28/2019 Version: 4.8

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SAFETY DATA SHEET

Version 5.11 Revision Date 08/09/2016 Print Date 06/22/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Carbon tetrachloride

Product Number : 571016
Brand : Aldrich
Index-No. : 602-008-00-5

CAS-No. : 56-23-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich

3050 Spruce Street SAINT LOUIS MO 63103

USA

Telephone : +1 800-325-5832 Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +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 3), H301 Acute toxicity, Inhalation (Category 3), H331 Acute toxicity, Dermal (Category 3), H311 Skin sensitisation (Sub-category 1B), H317 Carcinogenicity (Category 2), H351

Specific target organ toxicity - repeated exposure, Inhalation (Category 1), Liver, Kidney, H372

Acute aquatic toxicity (Category 3), H402 Chronic aquatic toxicity (Category 3), H412 Hazardous to the ozone layer (Category 1), H420

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

H372



Signal word Danger

Hazard statement(s)

H301 + H311 + H331 Toxic if swallowed, in contact with skin or if inhaled

H317 May cause an allergic skin reaction. H351 Suspected of causing cancer.

Causes damage to organs (Liver, Kidney) through prolonged or repeated

exposure if inhaled.

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H412 Harmful to aquatic life with long lasting effects.

Precautionary statement(s)

P201 Obtain special instructions before use.

P202 Do not handle until all safety precautions have been read and

understood.

P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.

P264 Wash skin thoroughly after handling.

P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.

P272 Contaminated work clothing should not be allowed out of the workplace.

P273 Avoid release to the environment.

P280 Wear protective gloves/ protective clothing/ eye protection/ face

protection.

P301 + P310 + P330 IF SWALLOWED: Immediately call a POISON CENTER/doctor. Rinse

mouth.

P302 + P352 + P312 IF ON SKIN: Wash with plenty of soap and water. Call a POISON

CENTER or doctor/ physician if you feel unwell.

P304 + P340 + P311 IF INHALED: Remove person to fresh air and keep comfortable for

breathing. Call a POISON CENTER/doctor.

P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.
P362 Take off contaminated clothing and wash before reuse.
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.

P405 Store locked up.

P501 Dispose of contents/ container to an approved waste disposal plant.
P502 Refer to manufacturer/ supplier for information on recovery/ recycling.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Rapidly absorbed through skin.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : Tetrachloromethane

Formula : CCl₄

Molecular weight : 153.82 g/mol CAS-No. : 56-23-5 EC-No. : 200-262-8 Index-No. : 602-008-00-5

Hazardous components

Component	Classification	Concentration
Tetrachloromethane		
	Acute Tox. 3; Skin Sens. 1B; Carc. 2; STOT RE 1; Aquatic Acute 3; Aquatic Chronic 3; Ozone 1; H301 + H311 + H331, H317, H351, H372, H412	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

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.

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In case of skin contact

Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

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

Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

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

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Component	CAS-No.	Value	Control parameters	Basis
Tetrachloromethane	56-23-5	TWA	5.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Liver damag	е	
			uman carcinogen	
			utaneous absorptio	n
		STEL	10.000000 ppm	USA. ACGIH Threshold Limit Values
				(TLV)
		Liver damag		
			uman carcinogen	
			ıtaneous absorptio	
		ST	2.000000 ppm 12.600000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Oc	cupational Carcino	gen
		See Append		9
		TWA	10.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.17-1967	7	(00:11)
		CEIL	25.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.17-1967	<u> </u> 7	(OSTIA) - Table 2-2
				1104 0
		Peak	200.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.17-1967	7	
		See Table Z		
		TWA	5 ppm	USA. ACGIH Threshold Limit Values
				(TLV)
		Liver damag		
			uman carcinogen	
		Danger of cu	ıtaneous absorptio	n
		STEL	10 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Liver damag	е	
		Suspected h	uman carcinogen	
		Danger of cu	ıtaneous absorptio	n
		ST	2 ppm	USA. NIOSH Recommended
			12.6 mg/m3	Exposure Limits
		Potential Oc	cupational Carcino	
		See Append		•
		See Table Z		
		TWA	10 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		727 17 100	<u> </u> 7	(OOI IA) - I abic 2-2
		Z37.17-1967		LICA Commention of Francisco III 11
		CEIL	25 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.17-1967		T
		Peak	200 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.17-1967	7	
		TWA	2 ppm 12.6 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		PEL	2 ppm 12.6 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
	 	Skin	1	11.1.0 0,711.000 107)
		JKIII		

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С	200 ppm	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
Skin		
STEL	10 ppm	California permissible exposure
	63 mg/m3	limits for chemical contaminants
		(Title 8, Article 107)
Skin		

8.2 Exposure controls

Appropriate engineering controls

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Fluorinated rubber Minimum layer thickness: 0.7 mm Break through time: 480 min

Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.4 mm Break through time: 240 min

Material tested: Camatril® (KCL 730 / Aldrich Z677442, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method:

EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multipurpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance Form: liquid

Colour: colourless

b) Odour sweet

c) Odour Threshold No data available

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d) рΗ No data available

Melting point/freezing Melting point/range: -22.99 °C (-9.38 °F)

point

Initial boiling point and 77 °C (171 °F) at 1,013 hPa (760 mmHg) f)

boiling range

Flash point does not flash No data available h) Evaporation rate No data available Flammability (solid, gas)

Upper/lower No data available i) flammability or explosive limits

k) Vapour pressure 45 hPa (34 mmHg) at 0.3 °C (32.5 °F)

> 120 hPa (90 mmHg) at 19.8 °C (67.6 °F) 14,549 hPa (10,913 mmHg) at 24 °C (75 °F)

I) Vapour density No data available

m) Relative density 1.59 g/cm3 at 20 °C (68 °F) n) Water solubility 0.8461 g/l at 20 °C (68 °F) log Pow: 2.83 at 25 °C (77 °F)

o) Partition coefficient: n-

octanol/water

No data available

temperature g) Decomposition

p) Auto-ignition

No data available

temperature Viscosity No data available r) s) Explosive properties No data available

No data available Oxidizing properties

9.2 Other safety information

> Surface tension 26.7 mN/m at 20 °C (68 °F) 19.5 mN/m at 80 °C (176 °F)

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 **Conditions to avoid**

No data available

10.5 Incompatible materials

Strong oxidizing agents

10.6 **Hazardous decomposition products**

Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas Other decomposition products - No data available

In the event of fire: see section 5

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11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 2,350 mg/kg

LC50 Inhalation - Rat - 4 h - 8000 ppm

LD50 Dermal - Rabbit - > 20,000 mg/kg

No data available

Skin corrosion/irritation

Skin - Rabbit

Result: Mild skin irritation - 24 h

(Draize Test)

Serious eye damage/eye irritation

Eyes - Rabbit

Result: Mild eye irritation - 24 h

(Draize Test)

Respiratory or skin sensitisation

- Mouse

Result: The product is a skin sensitiser, sub-category 1B.

(OECD Test Guideline 429)

Germ cell mutagenicity

No data available

Carcinogenicity

This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification. Limited evidence of carcinogenicity in animal studies

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Tetrachloromethane)

NTP: Reasonably anticipated to be a human carcinogen (Tetrachloromethane)

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a

carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

Inhalation - Causes damage to organs through prolonged or repeated exposure. - Liver, Kidney

Aspiration hazard

No data available

Additional Information

RTECS: FG4900000

Vomiting, Diarrhoea, Abdominal pain, Nausea, Dizziness, Headache, Damage to the eyes., Liver injury may occur., Kidney injury may occur., Exposure to and/or consumption of alcohol may increase toxic effects., Contact with skin can cause:, Pain, Erythema, hyperemia

12. ECOLOGICAL INFORMATION

12.1 Toxicity

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Toxicity to fish mortality LC50 - Danio rerio (zebra fish) - 24.3 mg/l - 96 h

Toxicity to daphnia and

Immobilization EC50 - Daphnia magna (Water flea) - 35 mg/l - 48 h (OECD Test Guideline 202)

other aquatic

Toxicity to algae

invertebrates

Growth inhibition EC50 - Algae - 20 mg/l - 72 h

(OECD Test Guideline 201)

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

Bioaccumulation Lepomis macrochirus (Bluegill) - 21 d

- 52.3 µg/l

Bioconcentration factor (BCF): 30

12.4 Mobility in soil

No data available

Results of PBT and vPvB assessment 12.5

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Harmful to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1846 Class: 6.1 Packing group: II

Proper shipping name: Carbon tetrachloride

Reportable Quantity (RQ): 10 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 1846 Class: 6.1 Packing group: II EMS-No: F-A, S-A

Proper shipping name: CARBON TETRACHLORIDE

Marine pollutant: ves

IATA

UN number: 1846 Class: 6.1 Packing group: II

Proper shipping name: Carbon tetrachloride

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III. Section 313:

CAS-No. Revision Date 2007-07-01

Tetrachloromethane 56-23-5

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SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Tetrachloromethane	56-23-5	2007-07-01
Pennsylvania Right To Know Components		

Tetrachloromethane CAS-No. Revision Date 2007-07-01

New Jersey Right To Know Components

CAS-No. Revision Date Tetrachloromethane 56-23-5 2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the CAS-No. Revision Date State of California to cause cancer. 56-23-5 2007-09-28

Tetrachloromethane

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox. Acute toxicity

Aquatic Acute Acute aquatic toxicity
Aquatic Chronic Chronic aquatic toxicity

Carc. Carcinogenicity
H301 Toxic if swallowed.

H301 + H311 + Toxic if swallowed, in contact with skin or if inhaled

H331

H311 Toxic in contact with skin.

H317 May cause an allergic skin reaction.

H331 Toxic if inhaled.

H351 Suspected of causing cancer.

HMIS Rating

Health hazard: 2
Chronic Health Hazard: *
Flammability: 0
Physical Hazard 0

NFPA Rating

Health hazard: 2
Fire Hazard: 0
Reactivity Hazard: 0

Further information

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Preparation Information

Sigma-Aldrich Corporation Product Safety – Americas Region 1-800-521-8956

Version: 5.11 Revision Date: 08/09/2016 Print Date: 06/22/2019

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SAFETY DATA SHEET

Creation Date 13-Sep-2013 Revision Date 21-Jul-2015 Revision Number 2

1. Identification

Product Name Chromium

Cat No.: C318-500

Synonyms Chrome

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company Emergency Telephone Number

Fisher Scientific CHEMTREC®, Inside the USA: 800-424-9300
One Reagent Lane CHEMTREC®, Outside the USA: 001-703-527-3887

Fair Lawn, NJ 07410 Tel: (201) 796-7100

2. Hazard(s) identification

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Specific target organ toxicity (single exposure)

Target Organs - Respiratory system.

Category 3

Label Elements

Signal Word

Warning

Hazard Statements

May cause respiratory irritation



Precautionary Statements

Prevention

Avoid breathing dust/fume/gas/mist/vapors/spray Use only outdoors or in a well-ventilated area

Chromium Revision Date 21-Jul-2015

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

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 of	on ingredients
•			

Component	CAS-No	Weight %
Chromium	7440-47-3	>95

4. First-aid measures

General Advice If symptoms persist, call a physician.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.

Obtain medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Obtain medical attention.

Inhalation Move to fresh air. If breathing is difficult, give oxygen. Obtain medical attention.

Ingestion Do not induce vomiting. Obtain medical attention.

Most important symptoms/effects

None reasonably foreseeable.

Notes to Physician

Treat symptomatically

5. Fire-fighting measures

Unsuitable Extinguishing Media Carbon dioxide (CO2)

Flash Point Not applicable

Method - No information available

Autoignition Temperature

Explosion Limits

Not applicable

Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available

Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical

Dust can form an explosive mixture in air. Do not allow run-off from fire fighting to enter drains or water courses.

Hazardous Combustion Products

Chromium oxide

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

HealthFlammabilityInstabilityPhysical hazards211N/A

Chromium Revision Date 21-Jul-2015

6. Accidental release measures

Personal Precautions Environmental Precautions

Ensure adequate ventilation. Use personal protective equipment. Avoid dust formation. Do not flush into surface water or sanitary sewer system. Do not allow material to contaminate ground water system. Prevent product from entering drains. Local authorities should be advised if significant spillages cannot be contained. See Section 12 for additional ecological information. Avoid release to the environment. Collect spillage.

Methods for Containment and Clean Avoid dust formation. Sweep up or vacuum up spillage and collect in suitable container for **Up** disposal. Keep in suitable, closed containers for disposal.

7. Handling and storage

Handling Avoid dust formation. Wear personal protective equipment. Ensure adequate ventilation. Do

not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation.

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	
Chromium	TWA: 0.5 mg/m ³	(Vacated) TWA: 1 mg/m³	IDLH: 250 mg/m ³	
	-	TWA: 1 mg/m ³	TWA: 0.5 mg/m ³	

Component	Quebec	Mexico OEL (TWA)	Ontario TWAEV
Chromium	TWA: 0.5 mg/m ³	TWA: 0.5 mg/m ³	TWA: 0.5 mg/m ³

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. 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 protectionWear 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.

expectate limited and exceeded of it initiation of outlet eyimptome and experience

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

9. Physical and chemical properties

Physical StatePowderAppearanceSilverOdorOdorless

Odor ThresholdNo information availablepHNo information availableMelting Point/Range1857.2 °C / 3375 °F

Chromium Revision Date 21-Jul-2015

Boiling Point/Range2640 °C / 4784 °FFlash PointNot applicableEvaporation RateNot applicable

Flammability (solid,gas) No information available

Flammability or explosive limits

UpperNo data availableLowerNo data availableVapor PressureNo information available

Vapor Density Not applicable

Relative Density 7.2

Solubility Insoluble in water Partition coefficient; n-octanol/water No data available Autoignition Temperature Not applicable

Decomposition Temperature No information available

Viscosity Not applicable

Molecular Formula Cr Molecular Weight 51.996

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Sensitive to air.

Conditions to Avoid Incompatible products. Excess heat. Avoid dust formation.

Incompatible Materials Strong oxidizing agents, Strong acids

Hazardous Decomposition Products Chromium oxide

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Component Information

Toxicologically Synergistic No information available

Products

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

Irritation May cause irritation of respiratory tract

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
Chromium	7440-47-3	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

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Aspiration hazard No information available

Symptoms / effects,both acute and No information available

delayed

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated. See actual entry in RTECS for

complete information.

12. Ecological information

Ecotoxicity

The product contains following substances which are hazardous for the environment. Very toxic to aquatic organisms.

	Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
	Chromium	Not listed	LC50: 14.3 mg/l/96 H	Not listed	EC50: 0.07 mg/l/48 H
- 1			(Pimenhales promelas)		

Persistence and Degradability Bioaccumulation/ Accumulation

Insoluble in water

No information available.

Mobility

Is not likely mobile in the environment due its low water solubility.

13. Disposal considerations

Waste Disposal Methods

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

14. Transport information

DOT

UN-No UN3077

Proper Shipping Name ENVIRONMENTALLY HAZARDOUS SUBSTANCES, SOLID, N.O.S.

Proper technical name Chromium

Hazard Class 9
Packing Group III

TDG Not regulated

UN-No UN3077

Proper Shipping Name ENVIRONMENTALLY HAZARDOUS SUBSTANCES, SOLID, N.O.S.

Hazard Class 9
Packing Group III

<u>IATA</u>

UN-No UN3077

Proper Shipping Name Environmentally hazardous substance, solid, n.o.s

Hazard Class 9
Packing Group

IMDG/IMO

UN-No UN3077

Proper Shipping Name Environmentally hazardous substance, solid, n.o.s

Hazard Class 9
Packing Group III

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Chromium	Х	Х	_	231-157-5	-		Х	-	Χ	X	Х

Legend:

X - Listed

E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.

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- 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 %
Chromium	7440-47-3	>95	1.0

SARA 311/312 Hazardous Categorization

Acute Health Hazard

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
Chromium	-	-	X	X

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Chromium	X		-

OSHA Occupational Safety and Health Administration

Not applicable

CERCLA

Not applicable

Component	Hazardous Substances RQs	CERCLA EHS RQs
Chromium	5000 lb 10 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
Chromium	X	X	Х	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

Chromium Revision Date 21-Jul-2015

Mexico - Grade No information available

Canada

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class D2B Toxic materials



16. Other information

Prepared By Regulatory Affairs

Thermo Fisher Scientific

Email: EMSDS.RA@thermofisher.com

 Creation Date
 13-Sep-2013

 Revision Date
 21-Jul-2015

 Print Date
 21-Jul-2015

Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard

replacing the current legislation under 29 CFR 1910.1200 to align with the Globally

Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer

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

End of SDS

SAFETY DATA SHEET

Version 5.10 Revision Date 01/10/2018 Print Date 06/22/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : CHRYSENE, 98%

Product Number : 245186 Brand : Aldrich

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)

Germ cell mutagenicity (Category 2), H341 Carcinogenicity (Category 1B), H350 Acute aquatic toxicity (Category 1), H400 Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)

H341 Suspected of causing genetic defects.

H350 May cause cancer.

H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201 Obtain special instructions before use.

P202 Do not handle until all safety precautions have been read and

understood.

P273 Avoid release to the environment.

P281 Use personal protective equipment as required.

P308 + P313 IF exposed or concerned: Get medical advice/ attention.

P391 Collect spillage. P405 Store locked up.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula : C₁₈H₁₂ Molecular weight : 228.29 g/mol

Hazardous components

Component	nent Classification	
Chrysene		
	Muta. 2; Carc. 1B; Aquatic Acute 1; Aquatic Chronic 1; H341, H350, H410	90 - 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

No data available

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.

Provide appropriate exhaust ventilation at places where dust is formed.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Storage class (TRGS 510): 6.1D: Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis		
	Remarks	Cancer Substances for which there is a Biological Exposure Index or Indices (see BEI® section), see BEI® for Polycyclic Aromatic Hydrocarbons (PAHs) Exposure by all routes should be carefully controlled to levels as low as possible. Confirmed animal carcinogen with unknown relevance to humans				
Chrysene	218-01-9	TWA	0.200000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants		
		TWA	0.200000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants		
		As used in §1910.1000 (Table Z-1), coal tar pitch volatiles in the fused polycyclic hydrocarbons which volatilize from the distillation residues of coal, petroleum (excluding asphalt), w and other organic matter. Asphalt (CAS 8052-42-4, and CA 64742-93-4) is not covered under the 'coal tar pitch volatiles standard OSHA specifically regulated carcinogen				
		TWA	0.100000 mg/m3	USA. NIOSH Recommended Exposure Limits		
		Potential Occupational Carcinogen NIOSH considers coal tar, coal tar pitch, and creosote to be coal products. cyclohexane-extractable fraction See Appendix C				

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See App	endix A	
PEL	0.2 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
	-	1- Hydroxypyren e		Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift at end of workweek			

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method:

EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance Form: solid

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Colour: white, light yellow

b) Odour No data available Odour Threshold No data available No data available d) Melting point/freezing 253.0 °C (487.4 °F) e) point

Initial boiling point and

448.0 °C (838.4 °F)

boiling range

No data available

Flash point Evaporation rate No data available Flammability (solid, gas) No data available i)

j) Upper/lower flammability or explosive limits No data available

Vapour pressure No data available Vapour density No data available m) Relative density No data available

o) Partition coefficient: noctanol/water

log Pow: 5.73

insoluble

p) Auto-ignition temperature

n) Water solubility

No data available

Decomposition temperature

No data available

r) Viscosity No data available s) **Explosive properties** No data available Oxidizing properties No data available

Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

9.2

No data available

10.2 **Chemical stability**

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents

10.6 **Hazardous decomposition products**

Hazardous decomposition products formed under fire conditions. - Carbon oxides In the event of fire: see section 5

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11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

No data available

Inhalation: No data available Dermal: No data available

LD50 Intraperitoneal - Mouse - > 320 mg/kg

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

Laboratory experiments have shown mutagenic effects.

In vitro tests showed mutagenic effects

Carcinogenicity

This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Possible human carcinogen

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Chrysene)

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a

known or anticipated carcinogen by NTP.

OSHA: OSHA specifically regulated carcinogen (Chrysene)

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: Not available

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to daphnia and EC50 - Daphnia magna (Water flea) - 1.90 mg/l - 2 h other aquatic invertebrates

12.2 Persistence and degradability

No data available

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12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 3077 Class: 9 Packing group: III

Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (Chrysene)

Reportable Quantity (RQ): 100 lbs Poison Inhalation Hazard: No

IMDG

UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Chrysene)

Marine pollutant:yes

IATA

UN number: 3077 Class: 9 Packing group: III

Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Chrysene)

Further information

EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Chrysene	218-01-9	1994-04-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Chrysene	218-01-9	1994-04-01

	CAS-No.	Revision Date
Chrysene	218-01-9	1994-04-01

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New Jersey Right To Know Components

CAS-No. Revision Date Chrysene 218-01-9 1994-04-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer. CAS-No. Revision Date 2007-09-28

Chrysene

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute Acute aquatic toxicity
Aquatic Chronic Chronic aquatic toxicity

Carc. Carcinogenicity

H341 Suspected of causing genetic defects.

H350 May cause cancer. H400 Very toxic to aquatic life.

H410 Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard: 0
Chronic Health Hazard: *
Flammability: 0
Physical Hazard 0

NFPA Rating

Health hazard: 0
Fire Hazard: 0
Reactivity Hazard: 0

Further information

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Preparation Information

Sigma-Aldrich Corporation Product Safety – Americas Region 1-800-521-8956

Version: 5.10 Revision Date: 01/10/2018 Print Date: 06/22/2019

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SAFETY DATA SHEET

Version 4.8 Revision Date 09/03/2017 Print Date 11/10/2018

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Copper

Product Number : 31284 Brand : Aldrich

CAS-No. : 7440-50-8

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

Not a hazardous substance or mixture.

2.2 GHS Label elements, including precautionary statements

Not a hazardous substance or mixture.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula : Cu

Molecular weight : 63.55 g/mol CAS-No. : 7440-50-8 EC-No. : 231-159-6

Hazardous components

Component	Classification	Concentration
Copper		
		90 - 100 %

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4. FIRST AID MEASURES

4.1 Description of first aid measures

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration.

In case of skin contact

Wash off with soap and plenty of water.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

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

Avoid dust formation. Avoid breathing vapours, mist or gas.

For personal protection see section 8.

6.2 Environmental precautions

No special environmental precautions required.

6.3 Methods and materials for containment and cleaning up

Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.

Provide appropriate exhaust ventilation at places where dust is formed.

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.

Store under inert gas. Air sensitive.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 **Control parameters**

Components with workplace control parameters

Component	CAS-No.	Value	Control	Basis		
			parameters			
Copper	7440-50-8	TWA	1.000000	USA. ACGIH Threshold Limit Values		
			mg/m3	(TLV)		
	Remarks	Irritation				
		Gastrointe				
		metal fum		THOS SOULT I THE WAY		
		TWA	0.200000	USA. ACGIH Threshold Limit Values		
		1 '	mg/m3	(TLV)		
		Irritation	atinal			
		Gastrointe metal fum				
		TWA	1.000000	USA. NIOSH Recommended		
		IVVA	mg/m3	Exposure Limits		
		TWA	1.000000	USA. NIOSH Recommended		
		1 1 7 7	mg/m3	Exposure Limits		
		TWA	1.000000	USA. NIOSH Recommended		
		1 **/~	mg/m3	Exposure Limits		
		TWA	1.000000	USA. Occupational Exposure Limits		
		' ' ' ' '	mg/m3	(OSHA) - Table Z-1 Limits for Air		
			1119,1110	Contaminants		
		TWA	0.100000	USA. Occupational Exposure Limits		
			mg/m3	(OSHA) - Table Z-1 Limits for Air		
				Contaminants		
		TWA	1 mg/m3	USA. ACGIH Threshold Limit Values		
				(TLV)		
		Irritation				
		Gastrointe				
		metal fum				
		TWA	0.2 mg/m3	USA. ACGIH Threshold Limit Values		
				(TLV)		
		Irritation	. 41			
		Gastrointe				
		metal fum		LICA NIOCII De		
		TWA	1 mg/m3	USA. NIOSH Recommended		
		TWA	1 mg/m3	Exposure Limits USA. NIOSH Recommended		
		IVVA	i ilig/iliə	Exposure Limits		
		TWA	1 mg/m3	USA. Occupational Exposure Limits		
		' ' ' ' '	1 1119/1110	(OSHA) - Table Z-1 Limits for Air		
				Contaminants		
		TWA	0.1 mg/m3	USA. Occupational Exposure Limits		
			3.1g/,o	(OSHA) - Table Z-1 Limits for Air		
				Contaminants		
		PEL	0.1 mg/m3	California permissible exposure		
			J	limits for chemical contaminants		
				(Title 8, Article 107)		

8.2 **Exposure controls**

Appropriate engineering controls General industrial hygiene practice.

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Personal protective equipment

Eye/face protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

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

Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

No special environmental precautions required.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance Form: Wire

Colour: light red

b) Odourc) Odour Thresholdd) pHNo data availableNo data available

e) Melting point/freezing

point

Melting point/range: 1,083.4 °C (1,982.1 °F)

f) Initial boiling point and

boiling range

2,567 °C (4,653 °F)

g) Flash point No data available
h) Evaporation rate No data available
i) Flammability (solid, gas) No data available
j) Upper/lower No data available

j) Upper/lower flammability or explosive limits

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k) Vapour pressure
 No data available
 No data available
 No data available
 Relative density
 8.940 g/cm3
 No data available
 Partition coefficient: noctanol/water
 Auto-ignition temperature

No data available
No data available

q) Decomposition temperature

No data available

r) Viscosity No data available
 s) Explosive properties No data available
 t) Oxidizing properties No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong acids, Strong oxidizing agents, Acid chlorides, Halogens

10.6 Hazardous decomposition products

Other decomposition products - No data available Hazardous decomposition products formed under fire conditions. - Copper oxides In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

No data available

Inhalation: No data available

Dermal: No data available

LD50 Intraperitoneal - Mouse - 3.5 mg/kg

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

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IARC: No component of this product present at levels greater than or equal to 0.1% is identified as

probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a

known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a

carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: GL5325000

Symptoms of systemic copper poisoning may include: capillary damage, headache, cold sweat, weak pulse, and kidney and liver damage, central nervous system excitation followed by depression, jaundice, convulsions, paralysis, and coma. Death may occur from shock or renal failure. Chronic copper poisoning is typified by hepatic cirrhosis, brain damage and demyelination, kidney defects, and copper deposition in the cornea as exemplified by humans with Wilson's disease. It has also been reported that copper poisoning has lead to hemolytic anemia and accelerates arteriosclerosis.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

No data available

12.2 Persistence and degradability

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

Not dangerous goods

IMDG

Not dangerous goods

IATA

Not dangerous goods

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

CAS No

Pavision Data

SARA 311/312 Hazards

No SARA Hazards

Massachusetts Right To Know Components

No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

Copper	7440-50-8	1989-08-11
Copper	CAS-No. 7440-50-8	Revision Date 1989-08-11
New Jersey Right To Know Components		
	CAS-No.	Revision Date
Copper	7440-50-8	1989-08-11

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

HMIS Rating

Health hazard: 0
Chronic Health Hazard:
Flammability: 0
Physical Hazard 0

NFPA Rating

Health hazard: 0
Fire Hazard: 0
Reactivity Hazard: 0

Further information

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Preparation Information

Sigma-Aldrich Corporation Product Safety – Americas Region 1-800-521-8956

Version: 4.8 Revision Date: 09/03/2017 Print Date: 11/10/2018

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SIGMA-ALDRICH

MATERIAL SAFETY DATA SHEET

Date Printed: 20.10.2018
Date Updated: 07.05.2009
Version 1.4

Section 1 - Product and Company Information

Product Name 1,2:5,6-DIBENZANTHRACENE, 97% (NO BULK

ORDERS ALLOWED)

Product Number D31400 Brand ALDRICH

Company Sigma-Aldrich
Address 3050 Spruce Street

SAINT LOUIS MO 63103 US

Technical Phone: 800-325-5832 Fax: 800-325-5052 Emergency Phone: 314-776-6555

Section 2 - Composition/Information on Ingredient

Substance Name CAS # SARA 313 1,2:5,6-DIBENZANTHRACENE 53-70-3 Yes

Formula C22H14

Synonyms 1,2:5,6-Benzanthracene * DB(a,h)A * 1,2,5,6-Dba *

1,2,5,6-Dibenzanthraceen (Dutch) *

1,2:5,6-Dibenzanthracene *
1,2:5,6-Dibenz(a)anthracene *
Dibenzo(a,h)anthracene *

1,2:5,6-Dibenzoanthracene * RCRA waste number U063

RTECS Number: HN2625000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Toxic. Dangerous for the environment.

May cause cancer. Very toxic to aquatic organisms, may cause

long-term adverse effects in the aquatic environment.

Target organ(s): Lungs. Liver. Calif. Prop. 65 carcinogen.

HMIS RATING

HEALTH: 2*
FLAMMABILITY: 0
REACTIVITY: 0

NFPA RATING

HEALTH: 2

FLAMMABILITY: 0 REACTIVITY: 0

*additional chronic hazards present.

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE

If swallowed, wash out mouth with water provided person is conscious. Call a physician.

INHALATION EXPOSURE

If inhaled, remove to fresh air. If breathing becomes difficult, call a physician.

DERMAL EXPOSURE

In case of contact, immediately wash skin with soap and copious amounts of water.

EYE EXPOSURE

In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Section 5 - Fire Fighting Measures

FLASH POINT

N/A

AUTOIGNITION TEMP

N/A

FLAMMABILITY

N/A

EXTINGUISHING MEDIA

Suitable: Carbon dioxide, dry chemical powder, or appropriate foam.

FIREFIGHTING

Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes. Specific Hazard(s): Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL

PROCEDURE(S) OF PERSONAL PRECAUTION(S)

Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves. Wear disposable coveralls and discard them after use.

METHODS FOR CLEANING UP

Evacuate area.

Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING

User Exposure: Do not breathe dust. Do not get in eyes, on skin, on clothing. Avoid prolonged or repeated exposure.

STORAGE

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS

Use only in a chemical fume hood. Safety shower and eye bath.

PERSONAL PROTECTIVE EQUIPMENT

Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator.

Hand: Compatible chemical-resistant gloves.

Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES

Wash contaminated clothing before reuse. Wash thoroughly after handling.

EXPOSURE LIMITS

Country	Source	Type	Value
Poland		NDS	0.004 MG/M3
Poland		NDSCh	_
Doland		дрди	_

Section 9 - Physical/Chemical Properties

7	

Appearance	Physical State: So	lid
Property	Value	At Temperature or Pressure
Molecular Weight	278,3500 AMU	
рН	N/A	
BP/BP Range	524,000 °C	760,000 mmHg
MP/MP Range	262,000 °C	
Freezing Point	N/A	
Vapor Pressure	N/A	
Vapor Density	N/A	
Saturated Vapor Conc.	N/A	
Bulk Density	N/A	
Odor Threshold	N/A	
Volatile%	N/A	
VOC Content	N/A	
Water Content	N/A	
Solvent Content	N/A	
Evaporation Rate	N/A	
Viscosity	N/A	
Surface Tension	N/A	
Partition Coefficient	N/A	
Decomposition Temp.	N/A	
Flash Point	N/A	
Explosion Limits	N/A	
Flammability	N/A	
Autoignition Temp	N/A	
Refractive Index	N/A	
Optical Rotation	N/A	
Miscellaneous Data	N/A	

Solubility N/A

N/A = not available

Section 10 - Stability and Reactivity

Stable: Stable.

STABILITY

Materials to Avoid: Strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide.

HAZARDOUS POLYMERIZATION

Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE

Skin Contact: May cause skin irritation.

Skin Absorption: May be harmful if absorbed through the skin.

Eye Contact: May cause eye irritation.

Inhalation: Material may be irritating to mucous membranes and

upper respiratory tract. May be harmful if inhaled.

Ingestion: May be harmful if swallowed.

TARGET ORGAN(S) OR SYSTEM(S)

Lungs. Liver.

SIGNS AND SYMPTOMS OF EXPOSURE

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

CHRONIC EXPOSURE - CARCINOGEN

Result: This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Species: Rat

Route of Application: Intratracheal

Dose: 100 MG/KG

Result: Tumorigenic:Carcinogenic by RTECS criteria. Lungs,

Thorax, or Respiration: Tumors.

Species: Mouse

Route of Application: Oral

Dose: 4160 MG/KG Exposure Time: 26W

Frequency: I

Result: Lungs, Thorax, or Respiration:Tumors. Tumorigenic:Carcinogenic by RTECS criteria.

Species: Mouse

Route of Application: Skin

Dose: 1200 MG/KG Exposure Time: 50W

Frequency: I

Result: Tumorigenic: Tumors at site or application.

Tumorigenic:Carcinogenic by RTECS criteria. Skin and Appendages:

Other: Tumors.

Species: Mouse

Route of Application: Subcutaneous

Dose: 445 UG/KG

Result: Skin and Appendages: Other: Tumors.

Tumorigenic: Carcinogenic by RTECS criteria. Tumorigenic: Tumors

at site or application.

Species: Mouse

Route of Application: Intravenous

Dose: 40 MG/KG

Result: Tumorigenic: Neoplastic by RTECS criteria. Lungs, Thorax,

or Respiration: Tumors. Liver: Tumors.

Species: Mouse

Route of Application: Implant

Dose: 80 MG/KG

Result: Kidney, Ureter, Bladder: Tumors. Tumorigenic: Carcinogenic

by RTECS criteria.

Species: Mouse

Route of Application: Multiple

Dose: 40 MG/KG Exposure Time: 12D

Frequency: I

Result: Tumorigenic: Tumors at site or application. Lungs,

Thorax, or Respiration: Tumors. Tumorigenic: Equivocal tumorigenic

agent by RTECS criteria.

Species: Guinea pig

Route of Application: Subcutaneous

Dose: 250 MG/KG Exposure Time: 24D

Frequency: I

Result: Tumorigenic: Equivocal tumorigenic agent by RTECS criteria. Tumorigenic: Tumors at site or application. Lungs,

Thorax, or Respiration: Tumors.

Species: Guinea pig

Route of Application: Intravenous

Dose: 30 MG/KG

Result: Tumorigenic: Tumors at site or application. Lungs,

Thorax, or Respiration: Tumors. Tumorigenic: Equivocal tumorigenic

agent by RTECS criteria.

Species: Pigeon

Route of Application: Intramuscular

Dose: 6 MG/KG

Result: Tumorigenic:Carcinogenic by RTECS criteria. Liver:Tumors. Tumorigenic:Tumors at site or application.

Species: Frog

Route of Application: Intrarenal

Dose: 12 MG/KG

Result: Kidney, Ureter, Bladder:Kidney tumors. Lungs, Thorax, or Respiration:Tumors. Tumorigenic:Neoplastic by RTECS criteria.

Species: Mouse

Route of Application: Implant

Dose: 14 MG/KG

Result: Tumorigenic: Neoplastic by RTECS criteria. Tumorigenic: Tumors at site or application.

Species: Mouse

Route of Application: Subcutaneous

Dose: 78 UG/KG

Result: Tumorigenic: Neoplastic by RTECS criteria.

Tumorigenic: Tumors at site or application.

Species: Mouse

Route of Application: Oral

Dose: 4520 MG/KG Exposure Time: 36W

Frequency: C

Result: Tumorigenic:Carcinogenic by RTECS criteria. Lungs, Thorax, or Respiration:Tumors. Gastrointestinal:Tumors.

Species: Mouse

Route of Application: Implant

Dose: 200 MG/KG

Result: Tumorigenic:Neoplastic by RTECS criteria. Lungs, Thorax, or Respiration:Bronchiogenic carcinoma. Tumorigenic:Tumors at

site or application.

Species: Mouse

Route of Application: Skin

Dose: 6 UG/KG

Result: Tumorigenic: Neoplastic by RTECS criteria. Skin and

Appendages: Other: Tumors.

Species: Mouse

Route of Application: Subcutaneous

Dose: 6 MG/KG

Result: Tumorigenic: Equivocal tumorigenic agent by RTECS criteria. Tumorigenic: Tumors at site or application.

Species: Mouse

Route of Application: Skin

Dose: 400 MG/KG Exposure Time: 40W

Frequency: I

Result: Tumorigenic: Neoplastic by RTECS criteria. Skin and

Appendages: Other: Tumors.

Species: Mouse

Route of Application: Implant

Dose: 100 MG/KG

Result: Tumorigenic: Carcinogenic by RTECS criteria. Kidney,

Ureter, Bladder:Tumors. Tumorigenic:Tumors at site or

application.

Species: Rat

Route of Application: Subcutaneous

Dose: 135 MG/KG Exposure Time: 9W Frequency: I

Result: Tumorigenic:Neoplastic by RTECS criteria. Lungs, Thorax, or Respiration:Tumors. Tumorigenic:Tumors at site or application.

Species: Mouse

Route of Application: Subcutaneous

Dose: 400 MG/KG Exposure Time: 10W

Frequency: I

Result: Tumorigenic: Neoplastic by RTECS criteria.

Tumorigenic: Tumors at site or application.

IARC CARCINOGEN LIST

Rating: Group 2A

NTP CARCINOGEN LIST

Rating: Anticipated to be a carcinogen.

CHRONIC EXPOSURE - MUTAGEN

Result: Laboratory experiments have shown mutagenic effects.

Species: Human
Dose: 360 NMOL/L
Cell Type: Embryo
Mutation test: DNA

Species: Human Dose: 100 UMOL/L Cell Type: fibroblast

Mutation test: Unscheduled DNA synthesis

Species: Human
Dose: 10 MG/L

Cell Type: Other cell types

Mutation test: Unscheduled DNA synthesis

Species: Human Dose: 100 NMOL/L Cell Type: HeLa cell

Mutation test: Unscheduled DNA synthesis

Species: Human Dose: 54 UG/L

Cell Type: lymphocyte

Mutation test: Mutation in mammalian somatic cells.

Species: Rat

Route: Intratracheal Dose: 25500 UG/KG Exposure Time: 16H

Mutation test: Micronucleus test

Species: Rat
Route: Oral
Dose: 200 MG/KG

 ${\tt Mutation\ test:\ Morphological\ transformation.}$

Species: Rat
Dose: 100 UG/L
Cell Type: Embryo

Mutation test: Morphological transformation.

Species: Rat

Route: Intratracheal Dose: 25560 UG/KG Mutation test: DNA

Species: Rat

Route: Intratracheal Dose: 51150 UG/KG

Mutation test: Sister chromatid exchange

Species: Mouse

Route: Intraperitoneal

Dose: 500 MG/KG

Mutation test: Micronucleus test

Species: Mouse

Dose: 4250 UG/L (+S9) Cell Type: lymphocyte

Mutation test: Mutation in microorganisms

Species: Mouse Dose: 500 UG/L

Cell Type: fibroblast

Mutation test: Morphological transformation.

Species: Mouse Dose: 100 UG/L Cell Type: Embryo

Mutation test: Morphological transformation.

Species: Mouse
Dose: 6 UMOL/L
Cell Type: liver
Mutation test: DNA

Species: Mouse Route: Skin Dose: 40 UMOL/KG Mutation test: DNA

Species: Mouse
Dose: 1 MG/L

Cell Type: Other cell types

Mutation test: DNA

Species: Mouse Dose: 1 MG/L

Cell Type: Other cell types

Mutation test: Other mutation test systems

Species: Mouse
Dose: 510 NMOL/L
Cell Type: Embryo
Mutation test: DNA

Species: Mouse
Dose: 510 NMOL/L
Cell Type: Embryo

Mutation test: Other mutation test systems

Species: Hamster

Dose: 56400 NMOL/L (+S9)

Cell Type: lung

Mutation test: Mutation in microorganisms

Species: Hamster Dose: 2500 UG/L Cell Type: Embryo

Mutation test: Morphological transformation.

Species: Hamster Dose: 25 UG/L Cell Type: kidney

Mutation test: Morphological transformation.

Species: Hamster Dose: 5 MG/L Exposure Time: 24H

Cell Type: fibroblast Mutation test: DNA damage

Species: Hamster Dose: 360 NMOL/L Cell Type: Embryo Mutation test: DNA

Species: Hamster Dose: 5 MG/L Cell Type: kidney

Mutation test: DNA damage

Species: Hamster Dose: 1 MG/L Cell Type: lung Mutation test: DNA

Species: Hamster Dose: 1 MG/L Cell Type: lung

Mutation test: Other mutation test systems

Species: Hamster
Dose: 1 MMOL/L

Cell Type: fibroblast

Mutation test: Cytogenetic analysis

Species: Hamster

Route: Intraperitoneal

Dose: 900 MG/KG Exposure Time: 24H

Mutation test: Sister chromatid exchange

Species: Hamster Dose: 500 UG/L Cell Type: lung

Mutation test: Mutation in mammalian somatic cells.

Species: Mammal Dose: 2 NMOL/L

Cell Type: lymphocyte Mutation test: DNA damage Continu 10 Bull-viral Tufarmatian

Section 12 - Ecological Information

No data available.

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION

Contact a licensed professional waste disposal service to dispose
of this material. Observe all federal, state, and local
environmental regulations. (DN)Requires special label: "Contains a
substance which is regulated by Dannish work environmental law due
to the risk of carcinogenic properties."

Section 14 - Transport Information

-

DOT

Proper Shipping Name: Environmentally hazardous

substances, solid, n.o.s.

UN#: 3077 Class: 9

Packing Group: Packing Group III

Hazard Label: Class 9

PIH: Not PIH

IATA

Proper Shipping Name: Environmentally hazardous

substance, solid, n.o.s
IATA UN Number: 3077
Hazard Class: 9
Packing Group: III

Section 15 - Regulatory Information

EU DIRECTIVES CLASSIFICATION

Symbol of Danger: T-N

Indication of Danger: Toxic. Dangerous for the environment.

R: 45-50/53

Risk Statements: May cause cancer. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

S: 53-45-60-61

Safety Statements: Restricted to professional users. Attention - Avoid exposure - obtain special instructions before use. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). This material and its container must be disposed of as hazardous waste. Avoid release to the environment. Refer to special instructions/safety data sheets.

US CLASSIFICATION AND LABEL TEXT

Indication of Danger: Toxic. Dangerous for the environment. Risk Statements: May cause cancer. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Statements: Restricted to professional users. Attention - Avoid exposure - obtain special instructions before use. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Wear suitable protective clothing, gloves, and eye/face protection. This

material and its container must be disposed of as hazardous waste. Avoid release to the environment. Refer to special instructions/safety data sheets.

US Statements: Target organ(s): Lungs. Liver. Calif. Prop. 65 carcinogen.

UNITED STATES REGULATORY INFORMATION

SARA LISTED: Yes

NOTES: This product is subject to SARA section 313 reporting

requirements.

TSCA INVENTORY ITEM: Yes

UNITED STATES - STATE REGULATORY INFORMATION

CALIFORNIA PROP - 65

California Prop - 65: This product is or contains chemical(s) known to the state of California to cause cancer. This product is or contains chemical(s) known to the state of California to cause cancer.

CANADA REGULATORY INFORMATION

WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.

DSL: No NDSL: Yes

Section 16 - Other Information

DISCLAIMER

For R&D use only. Not for drug, household or other uses.

WARRANTY

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 Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. Copyright 2010 Sigma-Aldrich Co. License granted to make unlimitedpaper copies for internal use only.

SAFETY DATA SHEET

Version 5.9 Revision Date 05/07/2018 Print Date 06/28/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Fluoranthene

Product Number : 423947 Brand : Aldrich

CAS-No. : 206-44-0

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich

3050 Spruce Street SAINT LOUIS MO 63103

USA

Telephone : +1 800-325-5832 Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 4), H302 Acute aquatic toxicity (Category 1), H400 Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

!

Signal word Warning

Hazard statement(s)

H302 Harmful if swallowed.

H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P264 Wash skin thoroughly after handling.

P270 Do not eat, drink or smoke when using this product.

P273 Avoid release to the environment.

P301 + P312 IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell.

P330 Rinse mouth. P391 Collect spillage.

P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : Benzo[j,k]fluorene

Formula : C₁₆H₁₀

Molecular weight : 202.25 g/mol

CAS-No. : 206-44-0

EC-No. : 205-912-4

Hazardous components

Component	Classification	Concentration
Fluoranthene		
	Acute Tox. 4; Aquatic Acute 1; Aquatic Chronic 1; H302,	90 - 100 %
	H410	

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

No data available

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

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6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Avoid breathing dust.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.

Provide appropriate exhaust ventilation at places where dust is formed.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Storage class (TRGS 510): 13: Non Combustible Solids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control	Basis
			parameters	
Fluoranthene	206-44-0	PEL	0.2 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
	-	1- Hydroxypyren e	2.5 µg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift at	end of work	week	
		3- hydroxybenz o(a)pyrene		Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift at end of workweek			

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

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Personal protective equipment

Eye/face protection

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method:

EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator. For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance Form: solid

b) Odourc) Odour Thresholdd) pHNo data availableNo data available

e) Melting point/freezing Melting point/range: 105 - 110 °C (221 - 230 °F) - lit.

point

f) Initial boiling point and 384 °C (723 °F) - lit.

boiling range

g) Flash point 198.0 °C (388.4 °F) - closed cup

h) Evaporation rate No data availablei) Flammability (solid, gas) No data availablej) Upper/lower No data available

flammability or explosive limits

k) Vapour pressure No data available

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I) Vapour density No data available
 m) Relative density No data available
 n) Water solubility No data available
 o) Partition coefficient: nootanol/water

p) Auto-ignition temperature

No data available

q) Decomposition temperature

No data available

r) Viscosity No data available
 s) Explosive properties No data available
 t) Oxidizing properties No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 2,000 mg/kg

Inhalation: No data available

LD50 Dermal - Rabbit - 3,180 mg/kg

No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

Laboratory experiments have shown mutagenic effects.

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Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as

probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a

known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's

list of regulated carcinogens.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: LL4025000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish LC50 - Oncorhynchus mykiss (rainbow trout) - 0.0077 mg/l - 96 h

NOEC - Cyprinodon variegatus (sheepshead minnow) - 560 mg/l - 96 h

Toxicity to daphnia and

other aquatic invertebrates

Immobilization EC50 - Daphnia magna (Water flea) - > 0.005 - < 0.01 mg/l - 3

d

Immobilization EC50 - Daphnia magna (Water flea) - 0.78 mg/l - 20 h

NOEC - Daphnia magna (Water flea) - 0.085 mg/l - 48 h

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Very toxic to aquatic life with long lasting effects.

No data available

Aldrich - 423947 Page 6 of 8

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 substance, solid, n.o.s. (Fluoranthene)

Reportable Quantity (RQ): 100 lbs Poison Inhalation Hazard: No

IMDG

UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F

Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Fluoranthene)

Marine pollutant:yes

IATA

UN number: 3077 Class: 9 Packing group: III

Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Fluoranthene)

Further information

EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

OAO NI-

Davidalan Data

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Fluoranthene	206-44-0	2015-11-23
Pennsylvania Right To Know Components		
	CAS-No.	Revision Date
Fluoranthene	206-44-0	2015-11-23
	CAS-No.	Revision Date
Fluoranthene	206-44-0	2015-11-23
New Jersey Right To Know Components		
	CAS-No.	Revision Date
Fluoranthene	206-44-0	2015-11-23

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

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16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox. Acute toxicity

Aquatic Acute Acute aquatic toxicity
Aquatic Chronic Chronic aquatic toxicity
H302 Harmful if swallowed.
Very toxic to aquatic life.

H410 Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard: 1
Chronic Health Hazard: *
Flammability: 1
Physical Hazard 0

NFPA Rating

Health hazard: 1
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 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: 5.9 Revision Date: 05/07/2018 Print Date: 06/28/2019

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SAFETY DATA SHEET

Version 6.1 Revision Date 07/17/2018 Print Date 06/28/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Indeno[1,2,3-<I>cd</>]pyrene

Product Number : 48499 Brand : Supelco

CAS-No. : 193-39-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.

3050 Spruce Street ST. LOUIS MO 63103 UNITED STATES

Telephone : +1 314 771-5765 Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Carcinogenicity (Category 2), H351

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Warning

Hazard statement(s)

H351 Suspected of causing cancer.

Precautionary statement(s)

P201 Obtain special instructions before use.

P202 Do not handle until all safety precautions have been read and

understood.

P281 Use personal protective equipment as required.

P308 + P313 IF exposed or concerned: Get medical advice/ attention.

P405 Store locked up.

Supelco- 48499

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula : C₂₂H₁₂

Molecular weight : 276.33 g/mol

CAS-No. : 193-39-5

EC-No. : 205-893-2

Hazardous components

Component	Classification	Concentration
Indeno[1,2,3-cd]pyrene		
	Carc. 2; H351	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

For personal protection see section 8.

Supelco- 48499 Page 2 of 7

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.

Provide appropriate exhaust ventilation at places where dust is formed.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Store at room temperature.

Storage class (TRGS 510): 13: Non Combustible Solids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Contains no substances with occupational exposure limit values.

Hazardous components without workplace control parameters

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Indeno[1,2,3- cd]pyrene	193-39-5	1- Hydroxypyren e		Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift at end of workweek			

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eve/face protection

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection

Impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

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9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance Form: solid b) Odour No data available Odour Threshold No data available No data available d) pН e) Melting point/freezing 163.6 °C (326.5 °F) point Initial boiling point and

boiling range

536.0 °C (996.8 °F)

Flash point No data available No data available h) Evaporation rate Flammability (solid, gas) No data available

Upper/lower flammability or explosive limits No data available

k) Vapour pressure No data available Vapour density No data available m) Relative density No data available n) Water solubility No data available Partition coefficient: n-

octanol/water

No data available

p) Auto-ignition temperature

No data available

Decomposition temperature

No data available

Viscosity No data available r) s) Explosive properties No data available Oxidizing properties No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

No data available

Inhalation: No data available Dermal: No data available

No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP. or EPA classification.

Limited evidence of carcinogenicity in animal studies

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Indeno[1,2,3-cd]pyrene)

NTP: RAHC - Reasonably anticipated to be a human carcinogen (Indeno[1,2,3-cd]pyrene)

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's

list of regulated carcinogens.

Reproductive toxicity

No data available No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: Not available

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

No data available

12.2 Persistence and degradability

No data available

Supelco- 48499 Page 5 of 7

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available(Indeno[1,2,3-cd]pyrene)

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

Not dangerous goods

IMDG

Not dangerous goods

IATA

Not dangerous goods

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Indeno[1,2,3-cd]pyrene	193-39-5	1993-04-24
Pennsylvania Right To Know Components		
	CAS-No.	Revision Date
Indeno[1,2,3-cd]pyrene	193-39-5	1993-04-24
	CAS-No.	Revision Date
Indeno[1,2,3-cd]pyrene	193-39-5	1993-04-24
New Jersey Right To Know Components		
	CAS-No.	Revision Date
Indeno[1,2,3-cd]pyrene	193-39-5	1993-04-24
California Prop. 65 Components		
WARNING! This product contains a chemical known to the	CAS-No.	Revision Date
State of California to cause cancer. Indeno[1,2,3-cd]pyrene	193-39-5	2007-09-28

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16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

H351 Suspected of causing cancer.

Further information

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Preparation Information

Sigma-Aldrich Corporation Product Safety – Americas Region 1-800-521-8956

Version: 6.1 Revision Date: 07/17/2018 Print Date: 06/28/2019

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SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006 Version 6.0 Revision Date 10.11.2016 Print Date 17.07.2019

GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Iron Metal Clinical

Product Number : NIST937 Brand : Sigma-Aldrich

REACH No. : A registration number is not available for this substance as the substance

or its uses are exempted from registration, the annual tonnage does not

require a registration or the registration is envisaged for a later

registration deadline.

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.

3050 Spruce Street ST. LOUIS MO 63103 UNITED STATES

Telephone : +1 314 771-5765 Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887

SECTION 2: Hazards identification

- 2.1 Classification of the substance or mixture
- 2.2 Label elements
- 2.3 Other hazards none

SECTION 3: Composition/information on ingredients

SECTION 4: First aid measures

4.1 Description of first aid measures

No data available

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

No data available

5.2 Special hazards arising from the substance or mixture

No data available

5.3 Advice for firefighters

No data available

5.4 **Further information**

No data available

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures

For personal protection see section 8.

6.2 **Environmental precautions**

No data available

6.3 Methods and materials for containment and cleaning up

No data available

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

For precautions see section 2.2.

Conditions for safe storage, including any incompatibilities 7.2

No data available

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 **Control parameters**

8.2 **Exposure controls**

No data available

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	No data available
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	рН	No data available
e)	Melting point/freezing point	No data available
t/	Initial bailing paint and	No doto ovojloblo

Initial boiling point and

boiling range

No data available

g) Flash point No data available h) Evaporation rate No data available Flammability (solid, gas) No data available

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Upper/lower No data available j) flammability or explosive limits k) Vapour pressure No data available Vapour density No data available I) m) Relative density No data available n) Water solubility No data available o) Partition coefficient: n-No data available octanol/water No data available p) Auto-ignition temperature q) Decomposition No data available temperature r) Viscosity No data available s) Explosive properties No data available No data available Oxidizing properties

9.2 Other safety information

No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

No data available

10.2 Chemical stability

No data available

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

No data available

10.6 Hazardous decomposition products

In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

Skin corrosion/irritation

Serious eye damage/eye irritation

Respiratory or skin sensitisation

Germ cell mutagenicity

Sigma-Aldrich - NIST937 Page 3 of 4

Carcinogenicity

Reproductive toxicity

Specific target organ toxicity - single exposure

Specific target organ toxicity - repeated exposure

Aspiration hazard

Additional Information

RTECS: Not available

SECTION 12: Ecological information

- 12.1 Toxicity
- 12.2 Persistence and degradability
- 12.3 Bioaccumulative potential
- 12.4 Mobility in soil
- 12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

SECTION 13: Disposal considerations

13.1 Waste treatment methods

No data available

SECTION 14: Transport information

14.1 UN number

ADR/RID: - IMDG: - IATA: -

14.2 UN proper shipping name

ADR/RID: Not dangerous goods IMDG: Not dangerous goods IATA: Not dangerous goods

14.3 Transport hazard class(es)

ADR/RID: - IMDG: - IATA: -

14.4 Packaging group

ADR/RID: - IMDG: - IATA: -

14.5 Environmental hazards

ADR/RID: no IMDG Marine pollutant: no IATA: no

14.6 Special precautions for user

No data available

SECTION 15: Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixtureThis safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.2 Chemical safety assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Sigma-Aldrich - NIST937 Page 4 of 4

SDS preview

LEAD

DANGER

7439-92-1

by Fisher Scientific

Synonyms

C.I. 77575, C.I. Pigment Metal 4, EINECS 231-100-4, Glover, HSDB 231, Lead flake, Olow, Plumbum, CI 77575, Plumbum metallicum, Blei, CI pigment metal 4, EC 231-100-4, KS-4, Lead, Lead element, Lead S2, Olow [Polish], Omaha & grant, Pb-S 100, Rough lead bullion, CCRIS 1581, Lead metal, Lead S 2, SSO 1, UNII-2P299V784P

Hazard statements

Harmful if inhaled
Harmful if swallowed
May cause cancer
May cause damage to organs through prolonged or repeated exposure
May cause drowsiness or dizziness

Precautions

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 eat, drink or smoke when using this product
Use only outdoors or in a well-ventilated area
Rinse mouth
Store locked up

Hazard category

5/2/2018 Chemical info for Lead

Acute toxicity, inhalation, Acute toxicity, oral, Carcinogenicity, Specific target organ toxicity, repeated exposure, Specific target organ toxicity, single exposure; Narcotic effects



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The information contained herein is based on data compiled from the chemical components of the (M)SDS and may not accurately represent the safety hazards for the product. Only the manufacturer of the product can make actual representations about the hazard profile of a chemical product. No warranty is expressed or implied regarding the accuracy of these data or the results to be obtained from the use thereof.

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SAFETY DATA SHEET

Version 6.0 Revision Date 01/31/2017 Print Date 06/28/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Magnesium

Product Number : 200905
Brand : Sigma-Aldrich
Index-No. : 012-002-00-9

CAS-No. : 7439-95-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.

3050 Spruce Street ST. LOUIS MO 63103 UNITED STATES

Telephone : +1 314 771-5765 Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable solids (Category 1), H228

Self-heating substances and mixtures (Category 1), H251

Substances and mixtures, which in contact with water, emit flammable gases (Category 2), H261

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H228 Flammable solid.

H251 Self-heating: may catch fire.

H261 In contact with water releases flammable gases.

Precautionary statement(s)

P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking. P223 Keep away from any possible contact with water, because of violent

Sigma-Aldrich- 200905 Page 1 of 8

reaction and possible flash fire.

P231 + P232 Handle under inert gas. Protect from moisture.

P235 + P410 Keep cool. Protect from sunlight.

P240 Ground/bond container and receiving equipment.

P241 Use explosion-proof electrical/ ventilating/ lighting/ equipment.

P280 Wear protective gloves/ eye protection/ face protection.

P335 + P334 Brush off loose particles from skin. Immerse in cool water/ wrap in wet

bandages.

P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for

extinction.

P402 + P404 Store in a dry place. Store in a closed container.

P407 Maintain air gap between stacks/ pallets.

P413 Store bulk masses greater than .? kg/ .? lbs at temperatures not

exceeding .? °C/ .? °F.

P420 Store away from other materials.

P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Combustible dust

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula : Mg

 Molecular weight
 : 24.31 g/mol

 CAS-No.
 : 7439-95-4

 EC-No.
 : 231-104-6

 Index-No.
 : 012-002-00-9

Hazardous components

Component	Classification	Concentration
Magnesium (non pyrophoric)		
	Flam. Sol. 1; Self-heat. 1;	<= 100 %
	Water-react. 2; H228, H251, H261	

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Move out of dangerous area. Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

Sigma-Aldrich- 200905 Page 2 of 8

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Dry powder

5.2 Special hazards arising from the substance or mixture

Magnesium oxide

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Do not flush with water. Keep in suitable, closed containers for disposal. Contain spillage, pick up with an electrically protected vacuum cleaner or by wet-brushing and transfer to a container for disposal according to local regulations (see section 13).

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid formation of dust and aerosols. Further processing of solid materials may result in the formation of combu formation should be taken into consideration before additional processing

Provide appropriate exhaust ventilation at places where dust is formed. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Never allow product to get in contact with water during storage.

Store under inert gas. Air and moisture sensitive.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

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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 industria situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use (EN 143) respirator cartridges as a backup to engineering controls. If th full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance Form: Turnings
b) Odour No data available
c) Odour Threshold No data available
d) pH No data available

e) Melting point/freezing Melting point/range: 648 °C (1198 °F) - lit.

point

f) Initial boiling point and 1,090 °C (1,994 °F) - lit.

boiling range

g) Flash point ()No data availableh) Evaporation rate No data available

i) Flammability (solid, gas) May form combustible dust concentrations in air.

j) Upper/lower No data available flammability or

flammability or explosive limits

k) Vapour pressure 1 hPa at 621 °C (1150 °F)

Vapour density
 No data available

m) Relative density 1.74 g/mL at 25 °C (77 °F)

n) Water solubility No data available

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Partition coefficient: n-

octanol/water

No data available

p) Auto-ignition

temperature

The substance or mixture is classified as self heating with the category 1.

g) Decomposition temperature

No data available

No data available Viscosity r) No data available s) Explosive properties 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.

Possibility of hazardous reactions

Reacts violently with water.

10.4 Conditions to avoid

Heat, flames and sparks. Exposure to moisture

10.5 Incompatible materials

Acids, Strong oxidizing agents, Acid chlorides, Halogens

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Magnesium oxide

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

No data availableMagnesium (non pyrophoric)

Inhalation: No data available(Magnesium (non pyrophoric))

Dermal: No data available(Magnesium (non pyrophoric))

No data available(Magnesium (non pyrophoric))

Skin corrosion/irritation

No data available(Magnesium (non pyrophoric))

Serious eye damage/eye irritation

No data available(Magnesium (non pyrophoric))

Respiratory or skin sensitisation

No data available(Magnesium (non pyrophoric))

Germ cell mutagenicity

No data available(Magnesium (non pyrophoric))

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.

Sigma-Aldrich- 200905 Page 5 of 8 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(Magnesium (non pyrophoric))

No data available(Magnesium (non pyrophoric))

Specific target organ toxicity - single exposure

No data available(Magnesium (non pyrophoric))

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available(Magnesium (non pyrophoric))

Additional Information

RTECS: Not available

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, chills, Fever, fatigue, muscle pain, joint pain, rash, Anorexia.(Magnesium (non pyrophoric))

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.(Magnesium (non pyrophoric))

Liver - Irregularities - Based on Human Evidence

Liver - Irregularities - Based on Human Evidence(Magnesium (non pyrophoric))

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(Magnesium (non pyrophoric))

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

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13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Contact a licensed professional waste disposal service to dispose of this material. Burn in a chemical incinerator equipped with an afterburner and scrubber b highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1869 Class: 4.1 Packing group: III

Proper shipping name: Magnesium Poison Inhalation Hazard: No

IMDG

UN number: 1869 Class: 4.1 Packing group: III EMS-No: F-G, S-G

Proper shipping name: MAGNESIUM

IATA

UN number: 1869 Class: 4.1 Packing group: III

Proper shipping name: Magnesium

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Fire Hazard, Reactivity Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

CAS-No. Revision Date Magnesium (non pyrophoric) 7439-95-4 1993-04-24

Pennsylvania Right To Know Components

Magnesium (non pyrophoric)

CAS-No. Revision Date
7439-95-4

1993-04-24

New Jersey Right To Know Components

CAS-No. Revision Date Magnesium (non pyrophoric) 7439-95-4 1993-04-24

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

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H228 Flammable solid.

H251 Self-heating: may catch fire.

H261 In contact with water releases flammable gases.

HMIS Rating

Health hazard: 0
Chronic Health Hazard: *
Flammability: 3
Physical Hazard 2

NFPA Rating

Health hazard: 0
Fire Hazard: 0
Reactivity Hazard: 2

Further information

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Preparation Information

Sigma-Aldrich Corporation Product Safety – Americas Region 1-800-521-8956

Version: 6.0 Revision Date: 01/31/2017 Print Date: 06/28/2019

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SAFETY DATA SHEET

Version 6.1 Revision Date 05/28/2017 Print Date 06/28/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Manganese

Product Number : 463728 Brand : Aldrich

CAS-No. : 7439-96-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.

3050 Spruce Street ST. LOUIS MO 63103 UNITED STATES

Telephone : +1 314 771-5765 Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Substances and mixtures, which in contact with water, emit flammable gases (Category 1), H260 Acute aquatic toxicity (Category 3), H402 Chronic aquatic toxicity (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H260 In contact with water releases flammable gases which may ignite

spontaneously.

H412 Harmful to aquatic life with long lasting effects.

Precautionary statement(s)

P223 Keep away from any possible contact with water, because of violent

reaction and possible flash fire.

P231 + P232 Handle under inert gas. Protect from moisture.

Aldrich- 463728

P273 Avoid release to the environment.

P280 Wear protective gloves/ protective clothing/ eye protection/ face

protection.

P335 + P334 Brush off loose particles from skin. Immerse in cool water/ wrap in wet

bandages.

P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for

extinction.

P402 + P404 Store in a dry place. Store in a closed container.

P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula : Mn

Molecular weight : 54.94 g/mol CAS-No. : 7439-96-5 EC-No. : 231-105-1

Hazardous components

Component	Classification	Concentration
Manganese		
	Water-react. 1; Aquatic Acute 3; Aquatic Chronic 3; H260, H412	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Dry powder Carbon dioxide (CO2)

Unsuitable extinguishing media

Water

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5.2 Special hazards arising from the substance or mixture

Manganese/manganese oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust. For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wetbrushing and place in container for disposal according to local regulations (see section 13). Do not flush with water. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols.

Provide appropriate exhaust ventilation at places where dust is formed. Keep away from sources of ignition - No smoking.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Never allow product to get in contact with water during storage.

Moisture sensitive. Keep in a dry place.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

	LOAD N			Б.
Component	CAS-No.	Value	Control	Basis
			parameters	
Manganese	7439-96-5	TWA	0.200000	USA. ACGIH Threshold Limit Values
			mg/m3	(TLV)
	Remarks	Central Nerv	ous System impai	rment
		Adopted value	ues or notations er	nclosed are those for which changes
		are propose	d in the NIC	
		See Notice of	of Intended Change	es (NIC)
		С	5.000000	USA. Occupational Exposure Limits
			mg/m3	(OSHA) - Table Z-1 Limits for Air
				Contaminants
		Ceiling limit	is to be determined	d from breathing-zone air samples.
		С	5 mg/m3	USA. Occupational Exposure Limits
				(OSHA) - Table Z-1 Limits for Air
				Contaminants
		Ceiling limit is to be determined from breathing-zone air samples.		

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TWA	1.000000	USA. NIOSH Recommended	
	mg/m3	Exposure Limits	
ST	3.000000	USA. NIOSH Recommended	
	mg/m3	Exposure Limits	
TWA	1.000000	USA, NIOSH Recommended	
	mg/m3	Exposure Limits	
ST	3.000000	USA. NIOSH Recommended	
	mg/m3	Exposure Limits	
С	5.000000	USA. Occupational Exposure Limits	
	mg/m3	(OSHA) - Table Z-1 Limits for Air	
	IIIg/IIIO	Contaminants	
Coiling lim	it is to be determin	_	
		ned from breathing-zone air samples.	
TWA	1.000000	USA. NIOSH Recommended	
	mg/m3	Exposure Limits	
ST	3.000000	USA. NIOSH Recommended	
	mg/m3	Exposure Limits	
TWA	0.200000	USA. ACGIH Threshold Limit Values	
	mg/m3	(TLV)	
	ervous System imp		
Adopted v	Adopted values or notations enclosed are those for which changes		
	sed in the NIC	_	
	See Notice of Intended Changes (NIC) varies		
TWA	0.100000	USA. ACGIH Threshold Limit Values	
	mg/m3	(TLV)	
Central No	ervous System imp		
	2015 Adoption		
varies	p		
TWA	0.020000	USA. ACGIH Threshold Limit Values	
1 7 7 7	mg/m3	(TLV)	
Control No	ervous System imp		
2015 Ado		dalifilefit	
	ption		
varies	1 mg/== 2	LICA MIOCH Docommonded	
TWA	1 mg/m3	USA. NIOSH Recommended	
6=	0 ' 0	Exposure Limits	
ST	3 mg/m3	USA. NIOSH Recommended	
		Exposure Limits	
TWA	0.1 mg/m3	USA. ACGIH Threshold Limit Values	
		(TLV)	
Central No	ervous System imp	pairment	
Not classi	fiable as a human	carcinogen	
varies		-	
TWA	0.02 mg/m3	USA. ACGIH Threshold Limit Values (TLV)	
Central No	ervous Svetem imp		
	Central Nervous System impairment Not classifiable as a human carcinogen		
	varies		
varies	valics		

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.

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Body Protection

Impervious clothing, Flame retardant protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use (EN 143) respirator cartridges as a backup to engineering controls. If th full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance Form: powder

Colour: grey

b) Odourc) Odour Thresholdd) pHNo data availableNo data available

e) Melting point/freezing

point

Melting point/range: 1,244 °C (2,271 °F) - lit.

f) Initial boiling point and

boiling range

1,962 °C (3,564 °F) - lit.

g) Flash point ()Not applicable
h) Evaporation rate No data available
i) Flammability (solid, gas) No data available
i) Happer/legger

i) Upper/lower flammability or explosive limits No data available

k) Vapour pressure No data availablel) Vapour density No data available

m) Relative density 7.3 g/mL at 25 °C (77 °F)

n) Water solubilityNo data availableo) Partition coefficient: n-No data available

octanol/water
p) Auto-ignition

No data available

q) Decomposition temperature

No data available

r) Viscosity No data availables) Explosive properties No data availablet) Oxidizing properties No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

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10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

Reacts violently with water.

10.4 Conditions to avoid

Exposure to moisture

10.5 Incompatible materials

acids, Halogens, Bases, Phosphorus, Sulphur oxides, Peroxides

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Manganese/manganese oxides

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 9,000 mg/kg(Manganese)

Inhalation: No data available(Manganese)

Dermal: No data available(Manganese)

No data available(Manganese)

Skin corrosion/irritation

Skin - Rabbit(Manganese)

Result: Mild skin irritation - 24 h

Serious eye damage/eye irritation

Eyes - Rabbit(Manganese)
Result: Mild eye irritation - 24 h

Respiratory or skin sensitisation

No data available(Manganese)

Germ cell mutagenicity

No data available(Manganese)

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as

probable, possible or confirmed human carcinogen by IARC.

No component of this product present at levels greater than or equal to 0.1% is identified as

probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a

known or anticipated carcinogen by NTP.

No component of this product present at levels greater than or equal to 0.1% is identified as a

known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a

carcinogen or potential carcinogen by OSHA.

No component of this product present at levels greater than or equal to 0.1% is identified as a

carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available(Manganese)

May cause reproductive disorders. (Manganese)

Specific target organ toxicity - single exposure

No data available(Manganese)

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Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available(Manganese)

Additional Information

RTECS: 009275000

Men exposed to manganese dusts showed a decrease in fertility. Chronic man system. Early symptoms include languor, sleepiness and weakness in the le disturbances such as uncontrollable laughter and a spastic gait with tend cases. High incidence of pneumonia has been found in workers exposed to t(Manganese)

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence(Manganese)

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to daphnia and EC50 - Daphnia magna (Water flea) - 40 mg/l - 48 h(Manganese) other aquatic invertebrates

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available(Manganese)

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Harmful to aquatic life.

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber b highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 3208 Class: 4.3 Packing group: I

Proper shipping name: Metallic substance, water-reactive, n.o.s. (Manganese)

Poison Inhalation Hazard: No

IMDG

UN number: 3208 Class: 4.3 Packing group: I EMS-No: F-G, S-N Proper shipping name: METALLIC SUBSTANCE, WATER-REACTIVE, N.O.S. (Manganese)

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IATA

UN number: 3208 Class: 4.3 Packing group: I

Proper shipping name: Metallic substance, water-reactive, n.o.s. (Manganese)

IATA Passenger: Not permitted for transport

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

Manganese CAS-No. Revision Date 2007-07-01

SARA 311/312 Hazards

Reactivity Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

Manganese CAS-No. Revision Date 2007-07-01

Pennsylvania Right To Know Components

Manganese CAS-No. Revision Date 7439-96-5 2007-07-01

New Jersey Right To Know Components

Manganese CAS-No. Revision Date 7439-96-5 2007-07-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

H260 In contact with water releases flammable gases which may ignite spontaneously.

H402 Harmful to aquatic life.

H412 Harmful to aquatic life with long lasting effects.

HMIS Rating

Health hazard: 0
Chronic Health Hazard: *
Flammability: 3
Physical Hazard 2

NFPA Rating

Health hazard: 0
Fire Hazard: 0
Reactivity Hazard: 2
Special hazard.1: W

Further information

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or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation Product Safety – Americas Region 1-800-521-8956

Version: 6.1 Revision Date: 05/28/2017 Print Date: 06/28/2019

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SAFETY DATA SHEET

Version 3.15 Revision Date 03/05/2018 Print Date 11/10/2018

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Mercury

Product Number : 215457
Brand : Sigma-Aldrich
Index-No. : 080-001-00-0

CAS-No. : 7439-97-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : 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, Inhalation (Category 2), H330 Reproductive toxicity (Category 1B), H360

Specific target organ toxicity - repeated exposure (Category 1), H372

Acute aquatic toxicity (Category 1), H400 Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)

H330 Fatal if inhaled.

H360 May damage fertility or the unborn child.

H372 Causes damage to organs through prolonged or repeated exposure.

H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201 Obtain special instructions before use.

P202 Do not handle until all safety precautions have been read and

understood.

P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.

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P264 Wash skin thoroughly after handling.

P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.

P273 Avoid release to the environment.

P280 Wear protective gloves/ protective clothing/ eye protection/ face

protection.

P284 Wear respiratory protection.

P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for

breathing. Immediately call a POISON CENTER/doctor.

P308 + P313 IF exposed or concerned: Get medical advice/ attention.

P391 Collect spillage.

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

P405 Store locked up.

P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula : Hg

 Molecular weight
 : 200.59 g/mol

 CAS-No.
 : 7439-97-6

 EC-No.
 : 231-106-7

 Index-No.
 : 080-001-00-0

Hazardous components

Component	Classification	Concentration
Mercury		
	Acute Tox. 2; Repr. 1B; STOT	90 - 100 %
	RE 1; Aquatic Acute 1; Aquatic	:
	Chronic 1; H330, H360, H372,	
	H410	

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

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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

Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal. In some instances, a mercury spill kit may be used. Please consult with your site EHS representative to determine the most appropriate clean up method. Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Store under inert gas.

Storage class (TRGS 510): 6.1B: Non-combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Components with workplace control parameters					
Component	CAS-No.	Value	Control	Basis	
			parameters		
Mercury	7439-97-6	С	0.1 mg/m3	USA. NIOSH Recommended	
				Exposure Limits	
	Remarks	Potential for	dermal absorption	n	
		CEIL	1.0mg/10m3	USA. Occupational Exposure Limits	
				(OSHA) - Table Z-2	
		TWA	0.05 mg/m3	USA. OSHA - TABLE Z-1 Limits for	
				Air Contaminants - 1910.1000	
		Skin notation			

TWA	0.025 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
Kidney dama Substances to (see BEI® see Not classifiat	for which there is a	a Biological Exposure Index or Indices
TWA	0.05 mg/m3	USA. NIOSH Recommended Exposure Limits
Potential for dermal absorption		

8.2 Exposure controls

Appropriate engineering controls

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method:

EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multipurpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance Form: liquid

Colour: silver, white

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b) Odour odourless

c) Odour Threshold No data availabled) pH No data available

e) Melting point/freezing Melting point/range: -38.87 °C (-37.97 °F) - lit.

point

Initial boiling point and boiling range

356.6 °C (673.9 °F) - lit.

g) Flash point Not applicableh) Evaporation rate No data availablei) Flammability (solid, gas) No data available

j) Upper/lower flammability or explosive limits

f)

No data available

k) Vapour pressure < 0.01 hPa (< 0.01 mmHg) at 20 °C (68 °F) 1 hPa (1 mmHg) at 126 °C (259 °F)

I) Vapour density 6.93 - (Air = 1.0)

m) Relative density 13.55 g/cm3 at 25 $^{\circ}$ C (77 $^{\circ}$ F) n) Water solubility 0.00006 g/l at 25 $^{\circ}$ C (77 $^{\circ}$ F)

o) Partition coefficient: noctanol/water No data available

p) Auto-ignition No data available

temperature

a) Decomposition

temperature

No data available

r) Viscosity No data available s) Explosive properties No data available

t) Oxidizing properties No data available

9.2 Other safety information

Relative vapour density 6.93 - (Air = 1.0)

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents, Ammonia, Azides, Nitrates, Chlorates, Copper

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Mercury/mercury oxides.

Other decomposition products - No data available

In the event of fire: see section 5

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11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

No data available

LC50 Inhalation - Rat - male - 2 h - < 27 mg/m3

Dermal: No data available

No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as

probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a

known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's

list of regulated carcinogens.

Reproductive toxicity

Presumed human reproductive toxicant

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard

No data available

Additional Information

RTECS: OV4550000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish mortality LC50 - Cyprinus carpio (Carp) - 0.160 mg/l - 96 h

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

Bioaccumulation Carassius auratus (goldfish) - 1,789 d

- 0.25 µg/l

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Bioconcentration factor (BCF): 155,986

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 2809 Class: 8 (6.1)

Proper shipping name: A. W. Mercury Reportable Quantity (RQ): 1 lbs Poison Inhalation Hazard: No

IMDG

IATA

UN number: 2809 Class: 8 (6.1)

Proper shipping name: Mercury

Packing group: III

Packing group: III

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.

CAS-No

7439-97-6

Povision Data

2015-11-23

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

Mercury	7439-97-6	2015-11-23
Pennsylvania Right To Know Components Mercury	CAS-No. 7439-97-6	Revision Date 2015-11-23
Mercury	CAS-No. 7439-97-6	Revision Date 2015-11-23
New Jersey Right To Know Components	CAS-No.	Revision Date

California Prop. 65 Components

Mercury

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WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive

CAS-No. 7439-97-6 Revision Date 2013-12-20

harm. Mercury

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox. Acute toxicity

Aquatic Acute Acute aquatic toxicity
Aquatic Chronic Chronic aquatic toxicity

H330 Fatal if inhaled.

H360 May damage fertility or the unborn child.

H372 Causes damage to organs through prolonged or repeated exposure.

H400 Very toxic to aquatic life.

H410 Very toxic to aquatic life with long lasting effects.

Repr. Reproductive toxicity

HMIS Rating

Health hazard: 2
Chronic Health Hazard: *
Flammability: 0
Physical Hazard 0

NFPA Rating

Health hazard: 2
Fire Hazard: 0
Reactivity Hazard: 0

Further information

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Preparation Information

Sigma-Aldrich Corporation Product Safety – Americas Region 1-800-521-8956

Version: 3.15 Revision Date: 03/05/2018 Print Date: 11/10/2018

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SAFETY DATA SHEET

Version 6.1 Revision Date 07/17/2018 Print Date 06/22/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : <I>m</>-Xylene

Product Number : 134902 Brand : Aldrich Index-No. : 601-022-00-9

CAS-No. : 108-38-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.

3050 Spruce Street ST. LOUIS MO 63103 UNITED STATES

Telephone : +1 314 771-5765 Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquids (Category 3), H226

Acute toxicity, Dermal (Category 4), H312

Skin irritation (Category 2), H315

Eye irritation (Category 2A), H319

Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335

Aspiration hazard (Category 1), H304

Acute aquatic toxicity (Category 3), H402

Chronic aquatic toxicity (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

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Signal word	Danger
Cidilal Wold	Danaci

Hazard statement(s)

H226 Flammable liquid and vapour.

H304 May be fatal if swallowed and enters airways.

H312 Harmful in contact with skin.
H315 Causes skin irritation.

H319 Causes serious eye irritation. H335 May cause respiratory irritation.

H412 Harmful to aquatic life with long lasting effects.

Precautionary statement(s)

P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.

P233 Keep container tightly closed.

P240 Ground/bond container and receiving equipment.

P241 Use explosion-proof electrical/ ventilating/ lighting equipment.

P242 Use only non-sparking tools.

P243 Take precautionary measures against static discharge.
P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.

P264 Wash skin thoroughly after handling.

P271 Use only outdoors or in a well-ventilated area.

P273 Avoid release to the environment.

P280 Wear protective gloves/ eye protection/ face protection.

P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER/doctor.

P303 + P361 + P353 IF ON SKIN (or hair): Remove/ Take off immediately all contaminated

clothing. Rinse skin with water/ shower.

P304 + P310 IF INHALED: Remove victim to fresh air and keep at rest in a position

comfortable for breathing. Call a POISON CENTER or doctor/physician if

you feel unwell.

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove

contact lenses, if present and easy to do. Continue rinsing.

P331 Do NOT induce vomiting.

P332 + P313 If skin irritation occurs: Get medical advice/ attention.
P337 + P313 If eye irritation persists: Get medical advice/ attention.
P362 Take off contaminated clothing and wash before reuse.

P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for

extinction.

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

P403 + P235 Store in a well-ventilated place. Keep cool.

P405 Store locked up.

P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : 1,3-Dimethylbenzene

Formula : C₈H₁₀

Molecular weight : 106.17 g/mol

CAS-No. : 108-38-3

EC-No. : 203-576-3

Index-No. : 601-022-00-9

Hazardous components

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m-Xylene		
	Flam. Liq. 3; Acute Tox. 4;	<= 100 %
	Skin Irrit. 2; Eye Irrit. 2A; STOT SE 3; Asp. Tox. 1;	
	Aquatic Acute 3; Aquatic	
	Chronic 3; H226, H304, H312,	
	H315, H319, H335, H412	

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

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6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge. For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Storage class (TRGS 510): 3: Flammable liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
m-Xylene	108-38-3	TWA	100 ppm 435 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	150 ppm 655 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	100 ppm 435 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	Remarks	The value in	mg/m3 is approxi	mate.
		TWA	100 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment		
		Upper Respiratory Tract irritation		
		Eye irritation		
		Substances for which there is a Biological Exposure Index or Indices (see BEI® section)		
		`	ble as [°] a human ca	rcinogen
		STEL	150 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment		
		Upper Respiratory Tract irritation		
		Eye irritation		
		Substances for which there is a Biological Exposure Index or Indices		
		(see BEI® section)		
		Not classifia	ble as a human ca	rcinogen

Biological occupational exposure limits

biological occupational exposure limits					
Component	CAS-No.	Parameters	Value	Biological	Basis
				specimen	
m-Xylene	108-38-3	Methylhippuri c acids	1.5g/g creatinine	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift (As soon as possible after exposure ceases)			

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

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Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Fluorinated rubber Minimum layer thickness: 0.7 mm Break through time: 480 min

Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.4 mm Break through time: 30 min

Material tested: Camatril® (KCL 730 / Aldrich Z677442, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method:

EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multipurpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance Form: liquid

Colour: colourless

b) Odourc) Odour Thresholdd) pHNo data availableNo data available

e) Melting point/freezing Melting point/range: -48 °C (-54 °F) - lit.

point

f) Initial boiling point and 138 - 139 °C (280 - 282 °F) - lit.

boiling range

g) Flash point 25.0 °C (77.0 °F) - closed cup

h) Evaporation rate No data availablei) Flammability (solid, gas) No data available

j) Upper/lower Upper explosion limit: 7 %(V)

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flammability or Lower explosion limit: 1.1 %(V) explosive limits

k) Vapour pressure 8.0 hPa at 20.0 °C (68.0 °F)

21.3 hPa at 37.7 °C(99.9 °F)

I) Vapour density No data available

m) Relative density 0.868 g/cm3 at 25 °C (77 °F)

n) Water solubility No data available

o) Partition coefficient: n-

octanol/water

log Pow: 3.2 at 20 °C (68 °F)

p) Auto-ignition 465.0 °C (869.0 °F) temperature 528.0 °C (982.4 °F)

q) Decomposition temperature

No data available

r) Viscosity No data availables) Explosive properties No data availablet) Oxidizing properties No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

Vapours may form explosive mixture with air.

10.4 Conditions to avoid

Heat, flames and sparks.

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - male - 6,602 mg/kg

(OECD Test Guideline 401)

LC50 Inhalation - Rat - male - 4 h - 6700 ppm

(Directive 67/548/EEC, Annex V, B.2.)

LD50 Dermal - Rabbit - male - 12,126 mg/kg

No data available

Skin corrosion/irritation

Skin - Rabbit

Result: Skin irritation - 24 h

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Serious eye damage/eye irritation

Eves - Rabbit

Result: Severe eye irritation - 24 h

Respiratory or skin sensitisation

- Mouse

Result: Does not cause skin sensitisation.

(OECD Test Guideline 429)

Germ cell mutagenicity

No data available

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (m-Xylene)

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as

probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a

known or anticipated carcinogen by NTP.

No component of this product present at levels greater than or equal to 0.1% is identified as a

known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's

list of regulated carcinogens.

No component of this product present at levels greater than or equal to 0.1% is on OSHA's

list of regulated carcinogens.

Reproductive toxicity

Overexposure may cause reproductive disorder(s) based on tests with laboratory animals.

Specific target organ toxicity - single exposure

Inhalation - May cause respiratory irritation.

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

May be fatal if swallowed and enters airways.

Additional Information

RTECS: ZE2275000

Liver injury may occur., Kidney injury may occur., Blood disorders, burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, narcosis, Lung irritation, chest pain, pulmonary edema, Central nervous system depression, Dermatitis, Gastrointestinal disturbance

Kidney -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish mortality LC50 - Fish - 11.23 mg/l - 96 h(m-Xylene)

(OECD Test Guideline 203)

Toxicity to daphnia and

other aquatic invertebrates

Remarks: No data available(m-Xylene)

Toxicity to algae Remarks: No data available(m-Xylene)

12.2 Persistence and degradability

No data available

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12.3 Bioaccumulative potential

Due to the distribution coefficient n-octanol/water, accumulation in organisms is not expected.

12.4 Mobility in soil

No data available(m-Xylene)

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Harmful to aquatic life with long lasting effects.

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1307 Class: 3 Packing group: III

Proper shipping name: Xylenes

Reportable Quantity (RQ) : 1000 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 1307 Class: 3 Packing group: III EMS-No: F-E, S-D

Proper shipping name: XYLENES

IATA

UN number: 1307 Class: 3 Packing group: III

Proper shipping name: Xylenes

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

m-Xylene 108-38-3 2007-07-01

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard

Massachusetts Right To Know Components

m-Xylene CAS-No. Revision Date 2007-07-01

Pennsylvania Right To Know Components

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CAS-No.

Revision Date

	CAS-No.	Revision Date
m-Xylene	108-38-3	2007-07-01
New Jersey Right To Know Components		

New Jersey Right To Know Components

CAS-No. **Revision Date** 108-38-3 2007-07-01 m-Xylene

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

H226	Flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H312	Harmful in contact with skin.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H402	Harmful to aquatic life.
H412	Harmful to aquatic life with long lasting effects.

Further information

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Preparation Information

Sigma-Aldrich Corporation Product Safety - Americas Region 1-800-521-8956

Version: 6.1 Revision Date: 07/17/2018 Print Date: 06/22/2019

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SAFETY DATA SHEET

Version 4.9 Revision Date 04/24/2018 Print Date 10/19/2018

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Nickel

Product Number : 577995
Brand : Aldrich
Index-No. : 028-002-01-4

CAS-No. : 7440-02-0

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich

3050 Spruce Street

SAINT LOUIS MO 63103

USA

Telephone : +1 800-325-5832 Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +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)

Skin sensitisation (Category 1), H317 Carcinogenicity (Category 2), H351

Specific target organ toxicity - repeated exposure, Inhalation (Category 1), H372

Acute aquatic toxicity (Category 3), H402 Chronic aquatic toxicity (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)

H317 May cause an allergic skin reaction. H351 Suspected of causing cancer.

H372 Causes damage to organs through prolonged or repeated exposure if

inhaled.

H412 Harmful to aquatic life with long lasting effects.

Precautionary statement(s)

P201 Obtain special instructions before use.

P202 Do not handle until all safety precautions have been read and

understood.

P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray. P264 Wash skin thoroughly after handling. P270 Do not eat, drink or smoke when using this product. Contaminated work clothing should not be allowed out of the workplace. P272 Avoid release to the environment. P273 Wear protective gloves/ protective clothing/ eye protection/ face P280 protection. IF ON SKIN: Wash with plenty of soap and water. P302 + P352 IF exposed or concerned: Get medical advice/ attention. P308 + P313 If skin irritation or rash occurs: Get medical advice/ attention. P333 + P313 P363 Wash contaminated clothing before reuse. P405 Store locked up.

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

P501

Formula : Ni

 Molecular weight
 : 58.69 g/mol

 CAS-No.
 : 7440-02-0

 EC-No.
 : 231-111-4

 Index-No.
 : 028-002-01-4

Hazardous components

Component	Classification	Concentration
Nickel, powder [particle diameter < 1 mm]		
	Skin Sens. 1; Carc. 2; STOT RE 1; Aquatic Acute 3; Aquatic Chronic 3; H317, H351, H372, H412	90 - 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

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5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

No data available

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust. For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.

Provide appropriate exhaust ventilation at places where dust is formed.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Handle and store under inert gas. Keep in a dry place.

Storage class (TRGS 510): 4.1B: Flammable solid hazardous materials

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Nickel, powder [particle diameter < 1 mm]	7440-02-0	TWA	1.5 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Dermatitis Pneumoconi Not suspecte	osis ed as a human care	cinogen

PEL	0.5 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)	
TWA	1 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants	
TWA	0.015 mg/m3	USA. NIOSH Recommended Exposure Limits	
	Potential Occupational Carcinogen See Appendix A		

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method:

EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance Form: powder Colour: grey

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b) Odour No data available Odour Threshold No data available No data available d) рΗ

Melting point/freezing e)

point

Melting point: 1,455 °C (2,651 °F)

Initial boiling point and f)

boiling range

2,730 °C (4,946 °F)

Not applicable Flash point h) Evaporation rate No data available i) Flammability (solid, gas) No data available

Upper/lower i) flammability or explosive limits No data available

k) Vapour pressure 1 hPa (1 mmHg) at 1,810 °C (3,290 °F)

Vapour density No data available

m) Relative density 8.9 g/cm3 at 25 °C (77 °F)

n) Water solubility insoluble

o) Partition coefficient: noctanol/water

Not applicable for inorganic substances

Auto-ignition temperature

No data available

Decomposition temperature

No data available

No data available r) Viscosity Explosive properties No data available 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

acids, Oxidizing agents, Sulphur compounds, Hydrogen gas, Oxygen, Methanol, organic solvents, Aluminium, Fluorine, Ammonia

10.6 **Hazardous decomposition products**

Hazardous decomposition products formed under fire conditions. - Nickel/nickel oxides Other decomposition products - No data available

In the event of fire: see section 5

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11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - male and female - > 9,000 mg/kg (OECD Test Guideline 401)

Dermal: No data available

No data available

Skin corrosion/irritation

Skin - Rabbit

Result: No skin irritation - 4 h (OECD Test Guideline 404)

Serious eye damage/eye irritation

Eyes - Rabbit

Result: No eye irritation (OECD Test Guideline 405)

Respiratory or skin sensitisation Germ cell mutagenicity

No data available

Carcinogenicity

Limited evidence of carcinogenicity in animal studies

IARC: 1 - Group 1: Carcinogenic to humans (Nickel, powder [particle diameter < 1 mm])

2B - Group 2B: Possibly carcinogenic to humans (Nickel, powder [particle diameter < 1 mm])

IARC: 1 - Group 1: Carcinogenic to humans (Nickel, powder [particle diameter < 1 mm])

2B - Group 2B: Possibly carcinogenic to humans (Nickel, powder [particle diameter < 1 mm])

NTP: RAHC - Reasonably anticipated to be a human carcinogen (Nickel, powder [particle diameter

< 1 mm

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's

list of regulated carcinogens.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

Inhalation - Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard

No data available

Additional Information

Repeated dose Rat - male and female - Inhalation - LOAEL : 0.0001 mg/l - OECD Test Guideline

toxicity 451

RTECS: Not available

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence Stomach - Irregularities - Based on Human Evidence

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12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish semi-static test LC50 - Oncorhynchus mykiss (rainbow trout) - 15.3 mg/l - 96 h

12.2 Persistence and degradability

The methods for determining biodegradability are not applicable to inorganic substances.

12.3 Bioaccumulative potential

12.4 Mobility in soil

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Harmful to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 3089 Class: 4.1 Packing group: II

Proper shipping name: Metal powders, flammable, n.o.s.

Reportable Quantity (RQ): 100 lbs Poison Inhalation Hazard: No

IMDG

IATA

UN number: 3089 Class: 4.1 Packing group: II

Proper shipping name: Metal powder, flammable, n.o.s.

15. REGULATORY INFORMATION

SARA 302 Components

This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

Nickel, powder [particle diameter < 1 mm] CAS-No. Revision Date 7440-02-0 2007-07-01

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

CAS-No. Revision Date Nickel, powder [particle diameter < 1 mm] 7440-02-0 2007-07-01

Pennsylvania Right To Know Components

CAS-No. Revision Date Nickel, powder [particle diameter < 1 mm] 7440-02-0 2007-07-01

California Prop. 65 Components

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CAS-No. 7440-02-0 Revision Date 2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute Acute aquatic toxicity
Aquatic Chronic Chronic aquatic toxicity

Carc. Carcinogenicity

H317 May cause an allergic skin reaction. H351 Suspected of causing cancer.

H372 Causes damage to organs through prolonged or repeated exposure if inhaled.

H402 Harmful to aquatic life.

H412 Harmful to aquatic life with long lasting effects.

HMIS Rating

Health hazard: 0
Chronic Health Hazard: *
Flammability: 1
Physical Hazard 0

NFPA Rating

Health hazard: 0
Fire Hazard: 1
Reactivity Hazard: 0

Further information

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Preparation Information

Sigma-Aldrich Corporation Product Safety – Americas Region 1-800-521-8956

Version: 4.9 Revision Date: 04/24/2018 Print Date: 10/19/2018

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SAFETY DATA SHEET

Version 6.1 Revision Date 08/07/2018 Print Date 06/29/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : <I>o</>-Xylene

Product Number : 95660

Brand : Sigma-Aldrich Index-No. : 601-022-00-9

CAS-No. : 95-47-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.

3050 Spruce Street ST. LOUIS MO 63103 UNITED STATES

Telephone : +1 314 771-5765 Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquids (Category 3), H226

Acute toxicity, Inhalation (Category 4), H332

Acute toxicity, Dermal (Category 4), H312

Skin irritation (Category 2), H315

Eye irritation (Category 2A), H319

Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335

Aspiration hazard (Category 1), H304

Acute aquatic toxicity (Category 3), H402

Chronic aquatic toxicity (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

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2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)

H226 Flammable liquid and vapour.

H304 May be fatal if swallowed and enters airways. H312 + H332 Harmful in contact with skin or if inhaled.

H315 Causes skin irritation.

H319 Causes serious eye irritation.
H335 May cause respiratory irritation.

H412 Harmful to aquatic life with long lasting effects.

Precautionary statement(s)

P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.

P233 Keep container tightly closed.

P240 Ground/bond container and receiving equipment.

P241 Use explosion-proof electrical/ ventilating/ lighting equipment.

P242 Use only non-sparking tools.

P243 Take precautionary measures against static discharge.
P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.

P264 Wash skin thoroughly after handling.

P271 Use only outdoors or in a well-ventilated area.

P273 Avoid release to the environment.

P280 Wear protective gloves/ protective clothing/ eye protection/ face

protection.

P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER/doctor.
P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing.

Rinse skin with water/shower.

P304 + P340 + P312 IF INHALED: Remove person to fresh air and keep comfortable for

breathing. Call a POISON CENTER/doctor if you feel unwell.

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove

contact lenses, if present and easy to do. Continue rinsing.

P331 Do NOT induce vomiting.

P332 + P313 If skin irritation occurs: Get medical advice/ attention.
P337 + P313 If eye irritation persists: Get medical advice/ attention.
P362 Take off contaminated clothing and wash before reuse.

P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to

extinguish.

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

P403 + P235 Store in a well-ventilated place. Keep cool.

P405 Store locked up.

P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : 1,2-Dimethylbenzene

Formula : C₈H₁₀

Molecular weight : 106.17 g/mol

CAS-No. : 95-47-6

EC-No. : 202-422-2

Index-No. : 601-022-00-9

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Hazardous components

Component	Classification	Concentration
o-Xylene		
	Flam. Liq. 3; Acute Tox. 4; Skin Irrit. 2; Eye Irrit. 2A; STOT SE 3; Asp. Tox. 1; Aquatic Acute 3; Aquatic Chronic 3; H226, H304, H312 + H332, H315, H319, H335, H412	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

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6.3 Methods and materials for containment and cleaning up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge. For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Storage class (TRGS 510): 3: Flammable liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis	
o-Xylene	95-47-6	TWA	100.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)	
	Remarks	Central Ner Substances (see BEI® s		rment a Biological Exposure Index or Indices	
	Eye & Upper Respirate Central Nervous Syste Substances for which to (see BEI® section) Not classifiable as a hi			stem impairment th there is a Biological Exposure Index or Indices thuman carcinogen	
	ppm 435.0		100.000000 ppm 435.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants	
		TWA	100.000000 ppm 435.000000 mg/m3	USA. NIOSH Recommended Exposure Limits	
		ST	150.000000 ppm 655.000000 mg/m3	USA. NIOSH Recommended Exposure Limits	
		The velve in	100.000000 ppm 435.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants	
The value in mg/m3 is approximate.					

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TWA	100.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)	
Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen			
STEL	150.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)	
Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen			
TWA	100 ppm	USA. ACGIH Threshold Limit Values (TLV)	
Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen			
STEL	150 ppm	USA. ACGIH Threshold Limit Values (TLV)	
Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen			
TWA	100 ppm 435 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants	
The value in mg/m3 is approximate.			

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
o-Xylene	95-47-6	Methylhippuri c acids	1,500.000 0 mg/g	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift (As soon as possible after exposure ceases)			
		Methylhippuri c acids	1.5g/g creatinine	Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift (As soon as possible after exposure ceases)			

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

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Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Fluorinated rubber Minimum layer thickness: 0.7 mm Break through time: 480 min

Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact

Material: Nitrile rubber

Minimum laver thickness: 0.4 mm Break through time: 30 min

Material tested: Camatril® (KCL 730 / Aldrich Z677442, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method:

EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multipurpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance Form: liquid

Colour: colourless

b) Odour No data available c) Odour Threshold No data available No data available d) Hq

e) Melting point/freezing point

Melting point/range: -26 - -23 °C (-15 - -9 °F) - lit.

Initial boiling point and

boiling range

143 - 145 °C (289 - 293 °F) - lit.

31.0 °C (87.8 °F) - closed cup g) Flash point

h) Evaporation rate No data available Flammability (solid, gas) No data available

Upper/lower Upper explosion limit: 6.7 %(V) flammability or Lower explosion limit: 0.9 %(V)

explosive limits

21.3 hPa at 37.7 °C (99.9 °F) Vapour pressure

Sigma-Aldrich- 95660 Page 6 of 10 I) Vapour density No data available

m) Relative density 0.879 g/mL at 20 °C (68 °F)

n) Water solubility 0.1705 g/l at 25 °C (77 °F) - partly soluble

o) Partition coefficient: n-

octanol/water

log Pow: 3.12 at 20 °C (68 °F)

p) Auto-ignition temperature

464.0 °C (867.2 °F)

q) Decomposition temperature No data available

r) Viscosity No data available
 s) Explosive properties No data available
 t) Oxidizing properties No data available

9.2 Other safety information

Surface tension 29.8 mN/m at 25.0 °C (77.0 °F)

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

Vapours may form explosive mixture with air.

10.4 Conditions to avoid

Heat, flames and sparks.

10.5 Incompatible materials

Oxidizing agents

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

No data available

LC50 Inhalation - Rat - male - 6 h - 18,800 mg/m3

Dermal: No data available

LD50 Intraperitoneal - Mouse - 1,364 mg/kg

Skin corrosion/irritation

Skin - Rabbit

Result: Irritating to skin. - 24 h

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

- Mouse

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Result: Does not cause skin sensitisation.

(OECD Test Guideline 429)

Germ cell mutagenicity

Ames test

Salmonella typhimurium

Result: negative

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as

probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a

known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's

list of regulated carcinogens.

Reproductive toxicity

No data available No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

May be fatal if swallowed and enters airways.

Additional Information

RTECS: ZE2450000

narcosis, Lung irritation, chest pain, pulmonary edema, Central nervous system depression, Dermatitis, Gastrointestinal disturbance, Liver injury may occur., Kidney injury may occur., Blood disorders

Nerves. -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish LC50 - Lepomis macrochirus (Bluegill) - 16.10 mg/l - 96 h(o-Xylene)

12.2 Persistence and degradability

Biodegradability aerobic - Exposure time 28 d(o-Xylene)

Result: 69.67 % - Not readily biodegradable.

(OECD Test Guideline 301F)

Remarks: The 10 day time window criterion is not fulfilled.

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available(o-Xylene)

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Harmful to aquatic life with long lasting effects.

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13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Contact a licensed professional waste disposal service to dispose of this material. Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1307 Class: 3 Packing group: III

Proper shipping name: Xylenes

Reportable Quantity (RQ) : 1000 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 1307 Class: 3 Packing group: III EMS-No: F-E, S-D

Proper shipping name: XYLENES

IATA

UN number: 1307 Class: 3 Packing group: III

Proper shipping name: Xylenes

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313: CAS-No. Revision Date

o-Xylene 95-47-6 2007-07-01

SARA 311/312 Hazards

Fire Hazard. Acute Health Hazard

Massachusetts Right To Know Components

o-Xylene CAS-No. Revision Date 2007-07-01

Pennsylvania Right To Know Components

o-Xylene CAS-No. Revision Date 95-47-6 2007-07-01

New Jersey Right To Know Components

o-Xylene CAS-No. Revision Date 2007-07-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

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16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

H226	Flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H312	Harmful in contact with skin.
H312 + H332	Harmful in contact with skin or if inhaled.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H335	May cause respiratory irritation.
H402	Harmful to aquatic life.
H412	Harmful to aquatic life with long lasting effects.

Further information

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Preparation Information

Sigma-Aldrich Corporation Product Safety – Americas Region 1-800-521-8956

Version: 6.1 Revision Date: 08/07/2018 Print Date: 06/29/2019

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SAFETY DATA SHEET

Version 6.0 Revision Date 05/26/2018 Print Date 06/22/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Pentachlorophenol

Product Number : P2604
Brand : Aldrich
Index-No. : 604-002-00-8

CAS-No. : 87-86-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.

3050 Spruce Street ST. LOUIS MO 63103 UNITED STATES

Telephone : +1 314 771-5765 Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 3), H301

Acute toxicity, Inhalation (Category 2), H330

Acute toxicity, Dermal (Category 3), H311

Skin irritation (Category 2), H315

Eye irritation (Category 2A), H319

Carcinogenicity (Category 2), H351

Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335

Acute aquatic toxicity (Category 1), H400

Chronic aquatic toxicity (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

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2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)

H301 + H311 Toxic if swallowed or in contact with skin.

H315 Causes skin irritation.

H319 Causes serious eye irritation.

H330 Fatal if inhaled.

H335 May cause respiratory irritation.
H351 Suspected of causing cancer.
H400 Very toxic to aquatic life.

H411 Toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201 Obtain special instructions before use.

P202 Do not handle until all safety precautions have been read and

understood.

P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.

P264 Wash skin thoroughly after handling.

P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.

P273 Avoid release to the environment.

P280 Wear protective gloves/ protective clothing/ eye protection/ face

protection.

P284 Wear respiratory protection.

P301 + P310 + P330 IF SWALLOWED: Immediately call a POISON CENTER/doctor. Rinse

mouth.

P302 + P352 + P312 IF ON SKIN: Wash with plenty of soap and water. Call a POISON

CENTER or doctor/physician if you feel unwell.

P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for

breathing. Immediately call a POISON CENTER/doctor.

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove

contact lenses, if present and easy to do. Continue rinsing. IF exposed or concerned: Get medical advice/ attention. If skin irritation occurs: Get medical advice/ attention.

P332 + P313 If skin irritation occurs: Get medical advice/ attention.
P337 + P313 If eye irritation persists: Get medical advice/ attention.
P362 Take off contaminated clothing and wash before reuse.

P391 Collect spillage.

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

P405 Store locked up.

P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

P308 + P313

 Molecular weight
 : 266.34 g/mol

 CAS-No.
 : 87-86-5

 EC-No.
 : 201-778-6

 Index-No.
 : 604-002-00-8

Hazardous components

Component	Classification	Concentration
Pentachlorophenol		
	Acute Tox. 3; Acute Tox. 2;	<= 100 %

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H351, H400, H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

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7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols.

Provide appropriate exhaust ventilation at places where dust is formed.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Storage class (TRGS 510): 6.1B: Non-combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control	Basis	
			parameters		
Pentachlorophenol	87-86-5	TWA	0.5 mg/m3	USA. ACGIH Threshold Limit Values (TLV)	
	Remarks	Central Nerv	ous System impair	ment	
		Upper Respi	ratory Tract irritation	on	
		Eye irritation			
		Cardiac impa			
				a Biological Exposure Index or Indices	
		(see BEI® se			
				vith unknown relevance to humans	
		Danger of cu	<u>ıtaneous absorptio</u>		
		STEL	1 mg/m3	USA. ACGIH Threshold Limit Values (TLV)	
		Central Nervous System impairment			
		Upper Respiratory Tract irritation Eye irritation Cardiac impairment Substances for which there is a Biological Exposure Index or Indices			
		(see BEI® se			
		Confirmed animal carcinogen with unknown relevance to humans			
			itaneous absorptio		
		TWA	0.5 mg/m3	USA. NIOSH Recommended Exposure Limits	
		Potential for dermal absorption			
		TWA	0.5 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants	
		Skin designation			
		PEL	0.5 mg/m3	California permissible exposure	
				limits for chemical contaminants (Title 8, Article 107)	
		Skin			

Biological occupational exposure limits

Biological occupational exposure limits					
Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Pentachlorophenol	87-86-5	pentachlorop henol Urine ACGIH - Biolog Exposure India (BEI)			
	Remarks	Prior to last shift of workweek			

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8.2 Exposure controls

Appropriate engineering controls

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Splash contact

Material: Fluorinated rubber Minimum layer thickness: 0.7 mm Break through time: 120 min

Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method:

EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance Form: crystalline

Colour: light red

b) Odourc) Odour ThresholdNo data available

d) pH No data available

e) Melting point/freezing Melting point/range: 165 - 180 °C (329 - 356 °F)

point

) Initial boiling point and 310 °C (590 °F)

boiling range

g) Flash point No data availableh) Evaporation rate No data available

i) Flammability (solid, gas) No data available

i) Upper/lower No data available

flammability or explosive limits

k) Vapour pressure 53.3 hPa at 211.2 °C (412.2 °F)

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I) Vapour density No data available

m) Relative density 1.978 g/mL at 25 °C (77 °F)

n) Water solubilityNo data availableo) Partition coefficient: n- log Pow: 5.12

o) Partition coefficient: noctanol/water

p) Auto-ignition temperature

No data available

q) Decomposition temperature

No data available

r) Viscosity No data availables) Explosive properties No data availablet) Oxidizing properties No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents, Strong bases

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 27 mg/kg

Remarks: Vascular:BP elevation not charactertized in autonomic section. Endocrine:Hyperglycemia. Nutritional and Gross Metabolic:Changes in:Body temperature increase.

LC50 Inhalation - Rat - 355 mg/m3

Remarks: Behavioral:Excitement. Behavioral:Muscle contraction or spasticity. Lungs, Thorax, or Respiration:Dyspnea. LD50 Dermal - Rat - 96.0 mg/kg

Remarks: Behavioral:Excitement. Behavioral:Muscle contraction or spasticity. Lungs, Thorax, or Respiration:Dyspnea.

No data available

Skin corrosion/irritation

Skin - Rabbit

Result: Open irritation test - 24.00 h

Serious eye damage/eye irritation

Eyes - Rabbit

Result: Mild eye irritation - 24.00 h

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Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

The evidence for carcinogenicity of pentachlorophenol (PCP) is based on assays that utilized less than pure PCP. Contaminants of PCP include: tri- or tetra- chlorophenol, hexachlorobenzene, polychlorinated dibenzo-p-dioxins, or polychlorinated dibenzofurans. Indications are that positive evidence for carcinogenicity is from the contaminant(s) and not the PCP. This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Limited evidence of carcinogenicity in animal studies

IARC: 1 - Group 1: Carcinogenic to humans (Pentachlorophenol)

NTP: RAHC - Reasonably anticipated to be a human carcinogen (Pentachlorophenol)

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's

list of regulated carcinogens.

Reproductive toxicity

No data available

Overexposure may cause reproductive disorder(s) based on tests with laboratory animals.

Specific target organ toxicity - single exposure

May cause respiratory irritation.

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: Not available

Convulsions

Kidney -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish LC50 - Cyprinodon variegatus (sheepshead minnow) - 0.16 - 0.5 mg/l - 96.0

h(Pentachlorophenol)

LC50 - Carassius auratus (goldfish) - 0.16 - 0.38 mg/l - 96.0

h(Pentachlorophenol)

LC50 - Oncorhynchus mykiss (rainbow trout) - 0.075 mg/l - 96.0

h(Pentachlorophenol)

NOEC - other fish - 0.01 mg/l - 24.0 h(Pentachlorophenol)

LOEC - other fish - 0.1 mg/l - 24.0 h(Pentachlorophenol)

Toxicity to daphnia and EC50 - Daphnia magna (Water flea) - 0.30 - 1.30 mg/l - 48 h(Pentachlorophenol)

other aquatic invertebrates

Toxicity to algae EC50 - No information available. - 0.36 mg/l - 10 d(Pentachlorophenol)

EC50 - Chlorella vulgaris (Fresh water algae) - 10.30 mg/l - 96

h(Pentachlorophenol)

Growth inhibition EC50 - Scenedesmus quadricauda (Green algae) - 0.08 mg/l

- 96 h(Pentachlorophenol)

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12.2 Persistence and degradability

Biodegradability Result: 99 % - Biodegradable

12.3 Bioaccumulative potential

Bioaccumulation Oncorhynchus mykiss (rainbow trout) - 144 h

- 0.0912 mg/l(Pentachlorophenol)

Bioconcentration factor (BCF): 482

12.4 Mobility in soil

No data available(Pentachlorophenol)

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 3155 Class: 6.1 Packing group: II

Proper shipping name: Pentachlorophenol Reportable Quantity (RQ) : 10 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 3155 Class: 6.1 Packing group: II EMS-No: F-A, S-A

Proper shipping name: PENTACHLOROPHENOL

Marine pollutant : yes

IATA

UN number: 3155 Class: 6.1 Packing group: II

Proper shipping name: Pentachlorophenol

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

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Pentachlorophenol	CAS-No. 87-86-5	Revision Date 2007-07-01
Pennsylvania Right To Know Components Pentachlorophenol	CAS-No. 87-86-5	Revision Date 2007-07-01
New Jersey Right To Know Components Pentachlorophenol	CAS-No. 87-86-5	Revision Date 2007-07-01
California Prop. 65 Components WARNING! This product contains a chemical known to the State of California to cause cancer. Pentachlorophenol	CAS-No. 87-86-5	Revision Date 2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

H301	Toxic if swallowed.
H301 + H311	Toxic if swallowed or in contact with skin.
H311	Toxic in contact with skin.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H330	Fatal if inhaled.
H335	May cause respiratory irritation.
H351	Suspected of causing cancer.
H400	Very toxic to aquatic life.
H411	Toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard: 3
Chronic Health Hazard: *
Flammability: 0
Physical Hazard 1

NFPA Rating

Health hazard: 4
Fire Hazard: 0
Reactivity Hazard: 0

Further information

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Preparation Information

Sigma-Aldrich Corporation Product Safety – Americas Region 1-800-521-8956

Version: 6.0 Revision Date: 05/26/2018 Print Date: 06/22/2019

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SAFETY DATA SHEET

Version 6.2 Revision Date 05/25/2018 Print Date 06/29/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Phenanthrene

Product Number : P11409 Brand : Aldrich

CAS-No. : 85-01-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.

3050 Spruce Street ST. LOUIS MO 63103 UNITED STATES

Telephone : +1 314 771-5765 Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 4), H302

Acute aquatic toxicity (Category 1), H400

Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Warning

Hazard statement(s)

H302 Harmful if swallowed.

H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P264 Wash skin thoroughly after handling.

P270 Do not eat, drink or smoke when using this product.

P273 Avoid release to the environment.

P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell.

Rinse mouth.

P391 Collect spillage.

P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Photosensitizer.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Molecular weight : 178.23 g/mol CAS-No. : 85-01-8 EC-No. : 201-581-5

Hazardous components

Component	Classification	Concentration
Phenanthrene		
	Acute Tox. 4; Aquatic Acute 1; Aquatic Chronic 1; H302, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

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6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Avoid breathing dust.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.

Provide appropriate exhaust ventilation at places where dust is formed.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Handle and store under inert gas.

Storage class (TRGS 510): 13: Non Combustible Solids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control	Basis	
			parameters		
Phenanthrene	85-01-8	TWA	0.200000	USA. Occupational Exposure Limits	
			mg/m3	(OSHA) - Table Z-1 Limits for Air	
				Contaminants	
		TWA	0.200000	USA. Occupational Exposure Limits	
			mg/m3	(OSHA) - Table Z-1 Limits for Air	
				Contaminants	
	Remarks	1910.1002			
		As used in §1910.1000 (Table Z-1), coal tar pitch volatiles include			
		the fused polycyclic hydrocarbons which volatilize from the			
		distillation residues of coal, petroleum (excluding asphalt), wood,			
		and other organic matter. Asphalt (CAS 8052-42-4, and CAS			
		64742-93-4) is not covered under the 'coal tar pitch volatiles'			
		standard			
		OSHA speci	fically regulated ca	rcinogen	
		TWA	0.100000	USA. NIOSH Recommended	
			mg/m3	Exposure Limits	
			cupational Carcino	•	
		NIOSH considers coal tar, coal tar pitch, and creosote to be coal tar			
		products.			
		cyclohexane-extractable fraction			
		See Append	ix C		

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See Append	lix A		
PEL	0.2 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)	
include fuse carcinogens petroleum (e Asphalt (CA	Coal tar pitch volatiles (benzene or cyclohexane-soluble fraction) include fused polycyclic hydrocarbons (some of which are known carcinogens) which volatilize from the distillation residues of coal, petroleum (excluding asphalt), wood, and other organic matter. Asphalt (CAS 8052-42-4, and CAS 64742-93-4) is not covered under the 'coal tar pitch volatiles' standard.		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological	Basis
				specimen	
Phenanthrene	85-01-8	1- Hydroxypyren		Urine	ACGIH - Biological Exposure Indices
		е			(BEI)
	Remarks	End of shift at end of workweek			

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method:

EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator. For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

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9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Form: solid Appearance

b) Odour No data available Odour Threshold No data available c) No data available

Melting point/freezing

point

Melting point/range: 98 - 100 °C (208 - 212 °F)

f) Initial boiling point and

boiling range

340 °C (644 °F)

g) Flash point No data available h) Evaporation rate No data available i) Flammability (solid, gas) No data available

Upper/lower flammability or explosive limits No data available

k) Vapour pressure No data available Vapour density No data available

m) Relative density 1.063 g/mL at 25 °C (77 °F)

n) Water solubility No data available o) Partition coefficient: nlog Pow: 4.46

octanol/water

p) Auto-ignition

No data available

temperature

q) Decomposition No data available

temperature

Viscosity No data available No data available

s) Explosive properties No data available Oxidizing properties

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

Aldrich-P11409 Page 5 of 8 In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Mouse - 700.0 mg/kg Inhalation: No data available Dermal: No data available

No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

Causes photosensitivity. Exposure to light can result in allergic reactions resulting in dermatologic lesions, which can vary from sunburnlike responses to edematous, vesiculated lesions, or bullae

Germ cell mutagenicity

No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as

probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a

known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's

list of regulated carcinogens.

Reproductive toxicity

No data available No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: Not available

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish LC50 - Oncorhynchus mykiss (rainbow trout) - 3.2 mg/l - 96.0 h(Phenanthrene)

Toxicity to daphnia and

EC50 - Daphnia pulex (Water flea) - 0.35 mg/l - 48 h(Phenanthrene)

other aquatic invertebrates

12.2 Persistence and degradability

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12.3 Bioaccumulative potential

Bioaccumulation Pimephales promelas (fathead minnow) - 28 d

- 0.00255 mg/l(Phenanthrene)

Bioconcentration factor (BCF): 5,100

12.4 Mobility in soil

No data available(Phenanthrene)

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 3077 Class: 9 Packing group: III

Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Phenanthrene)

Reportable Quantity (RQ) : 5000 lbs

no

Poison Inhalation Hazard: No

IMDG

UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F

Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Phenanthrene)

Marine pollutant : yes

IATA

UN number: 3077 Class: 9 Packing group: III

Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Phenanthrene)

Further information

EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

CAS-No. Revision Date

Phenanthrene 85-01-8 2007-07-01

SARA 311/312 Hazards

Acute Health Hazard

Massachusetts Right To Know Components

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CAS-No.

Revision Date

Phenanthrene	85-01-8	2007-07-01
Pennsylvania Right To Know Components		
	CAS-No.	Revision Date
Phenanthrene	85-01-8	2007-07-01
New Jersey Right To Know Components		
	CAS-No.	Revision Date
Phenanthrene	85-01-8	2007-07-01
California Prop. 65 Components		
WARNING! This product contains a chemical known to the	CAS-No.	Revision Date
State of California to cause cancer.	85-01-8	2007-09-28
Phenanthrene		

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

H302 Harmful if swallowed. H400 Very toxic to aquatic life.

H410 Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard: 1
Chronic Health Hazard: Flammability: 0
Physical Hazard 0

NFPA Rating

Health hazard: 1
Fire Hazard: 0
Reactivity Hazard: 0

Further information

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Preparation Information

Sigma-Aldrich Corporation Product Safety – Americas Region 1-800-521-8956

Version: 6.2 Revision Date: 05/25/2018 Print Date: 06/29/2019

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SAFETY DATA SHEET

Version 6.2 Revision Date 07/25/2018 Print Date 06/28/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : <|>p</>-Xylene

Product Number : 296333

Brand : Sigma-Aldrich Index-No. : 601-022-00-9

CAS-No. : 106-42-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.

3050 Spruce Street ST. LOUIS MO 63103 UNITED STATES

Telephone : +1 314 771-5765 Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquids (Category 3), H226

Acute toxicity, Inhalation (Category 4), H332

Acute toxicity, Dermal (Category 4), H312

Skin irritation (Category 2), H315

Acute aquatic toxicity (Category 2), H401

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

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Hazard statement(s)

H226 Flammable liquid and vapour.

H312 + H332 Harmful in contact with skin or if inhaled.

H315 Causes skin irritation. H401 Toxic to aquatic life.

Precautionary statement(s)

P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.

P233 Keep container tightly closed.

P240 Ground/bond container and receiving equipment.

P241 Use explosion-proof electrical/ ventilating/ lighting equipment.

P242 Use only non-sparking tools.

P243 Take precautionary measures against static discharge.
P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.

P264 Wash skin thoroughly after handling.

P271 Use only outdoors or in a well-ventilated area.

P273 Avoid release to the environment.

P280 Wear protective gloves/ eve protection/ face protection.

P303 + P361 + P353 IF ON SKIN (or hair): Remove/ Take off immediately all contaminated

clothing. Rinse skin with water/ shower.

P304 + P340 + P312 IF INHALED: Remove victim to fresh air and keep at rest in a position

comfortable for breathing. Call a POISON CENTER or doctor/ physician if

you feel unwell.

P332 + P313 If skin irritation occurs: Get medical advice/ attention.

P362 Take off contaminated clothing and wash before reuse.

P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for

extinction.

P403 + P235 Store in a well-ventilated place. Keep cool.

P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : 1,4-Dimethylbenzene

Formula : C₈H₁₀

Molecular weight : 106.17 g/mol

CAS-No. : 106-42-3

EC-No. : 203-396-5

Index-No. : 601-022-00-9

Hazardous components

Component	Classification	Concentration
p-Xylene		
	Flam. Liq. 3; Acute Tox. 4; Skin Irrit. 2; Aquatic Acute 2; H226, H312 + H332, H315, H401	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

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If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge. For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Storage class (TRGS 510): 3: Flammable liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

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8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
p-Xylene	106-42-3	TWA	100 ppm 435 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	150 ppm 655 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	100 ppm 435 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	Remarks	The value in	mg/m3 is approxi	mate.
		TWA	100 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nerv	ous System impai	rment
		Upper Respiratory Tract irritation		
		Eye irritation		
		Substances	for which there is a	a Biological Exposure Index or Indices
		(see BEI® s	ection)	
		Not classifia	<u>ble as a human ca</u>	
		STEL	150 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation		
		Eye irritation		
		Substances for which there is a Biological Exposure Index or Indices		
		(see BEI® section)		
		Not classifiable as a human carcinogen		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
p-Xylene	106-42-3	Methylhippuri c acids	1.5g/g creatinine	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift (As soon as possible after exposure ceases)			

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Fluorinated rubber Minimum layer thickness: 0.7 mm Break through time: 480 min

Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact Material: Nitrile rubber

Minimum layer thickness: 0.4 mm Break through time: 30 min

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Material tested: Camatril® (KCL 730 / Aldrich Z677442, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, Flame retardant antistatic protective clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multipurpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Form: liquid, clear a) Appearance

Colour: colourless

b) Odour No data available c) Odour Threshold No data available

pН No data available

e) Melting point/freezing Melting point/range: 12 - 13 °C (54 - 55 °F) - lit.

point

138 °C (280 °F) - lit.

Initial boiling point and f)

boiling range

25.0 °C (77.0 °F) - closed cup g) Flash point

h) Evaporation rate No data available Flammability (solid, gas) No data available

Upper/lower Upper explosion limit: 7 %(V) flammability or Lower explosion limit: 1.1 %(V)

explosive limits

21.3 hPa at 37.7 °C (99.9 °F) k) Vapour pressure 12.0 hPa at 20.0 °C(68.0 °F)

Vapour density No data available

m) Relative density 0.861 g/cm3 at 20 °C (68 °F)

n) Water solubility $0.2 \, g/l$

o) Partition coefficient: n-

octanol/water

log Pow: 3.15

p) Auto-ignition 529.0 °C (984.2 °F)

temperature

q) Decomposition No data available

temperature

No data available Viscosity

Sigma-Aldrich- 296333 Page 5 of 8 s) Explosive properties No data availablet) Oxidizing properties No data available

9.2 Other safety information

Surface tension 28.3 mN/m at 20.0 °C (68.0 °F)

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

Vapours may form explosive mixture with air.

10.4 Conditions to avoid

Heat, flames and sparks.

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 5,000 mg/kg

LD50 Oral - Rat - male - 3,523 mg/kg

LC50 Inhalation - Rat - 4 h - 4550 ppm

Remarks: Lungs, Thorax, or Respiration:Chronic pulmonary edema. Liver:Other changes. Blood:Changes in cell count (unspecified).

No data available

Skin corrosion/irritation

Skin - Rabbit

Result: Moderate skin irritation - 4 h

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (p-Xylene)

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a

known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's

list of regulated carcinogens.

Reproductive toxicity

No data available

May cause reproductive disorders.

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Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: ZE2625000

narcosis, Lung irritation, chest pain, pulmonary edema, Central nervous system depression, Gastrointestinal disturbance, Liver injury may occur., Kidney injury may occur., Blood disorders

Stomach - Irregularities - Based on Human Evidence Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish LC50 - Oncorhynchus mykiss (rainbow trout) - 2.60 mg/l - 96 h(p-Xylene)

LC50 - Carassius auratus (goldfish) - 18.00 mg/l - 24 h(p-Xylene)

Toxicity to daphnia and

other aquatic invertebrates

Toxicity to algae

EC50 - Daphnia magna (Water flea) - 35.50 - 63.10 mg/l - 48 h(p-Xylene)

EC50 - Pseudokirchneriella subcapitata (green algae) - 3.20 - 4.40 mg/l - 72

h(p-Xylene)

12.2 Persistence and degradability

Biodegradability Result: 87.8 % - Readily biodegradable.

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available(p-Xylene)

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1307 Class: 3 Packing group: III

Proper shipping name: Xylenes

Reportable Quantity (RQ) : 100 lbs

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Poison Inhalation Hazard: No

IMDG

UN number: 1307 Class: 3 Packing group: III EMS-No: F-E, S-D

Proper shipping name: XYLENES

IATA

UN number: 1307 Class: 3 Packing group: III

Proper shipping name: Xylenes

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

CAŚ-No. Revision Date 106-42-3 2007-07-01

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

p-Xylene

Full text of H-Statements referred to under sections 2 and 3.

H226 Flammable liquid and vapour.
H312 Harmful in contact with skin.

H312 + H332 Harmful in contact with skin or if inhaled.

H315 Causes skin irritation. H332 Harmful if inhaled. H401 Toxic to aquatic life.

Further information

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Preparation Information

Sigma-Aldrich Corporation Product Safety – Americas Region 1-800-521-8956

Version: 6.2 Revision Date: 07/25/2018 Print Date: 06/28/2019

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SAFETY DATA SHEET

Version 6.1 Revision Date 05/28/2017 Print Date 06/28/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Pyrene

Product Number : 185515 Brand : Aldrich

CAS-No. : 129-00-0

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.

3050 Spruce Street ST. LOUIS MO 63103 UNITED STATES

Telephone : +1 314 771-5765 Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute aquatic toxicity (Category 1), H400 Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)

H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P273 Avoid release to the environment.

P391 Collect spillage.

P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Rapidly absorbed through skin.

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3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : Benzo[<I>def</>]phenanthrene

Formula : C₁₆H₁₀

Molecular weight : 202.25 g/mol
CAS-No. : 129-00-0
EC-No. : 204-927-3

Hazardous components

Component	Classification	Concentration
Pyrene		
	Aquatic Acute 1; Aquatic	<= 100 %
	Chronic 1; H410	

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. For personal protection see section 8.

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6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Further processing of solid materials may result in the formation of combu formation should be taken into consideration before additional processing

Provide appropriate exhaust ventilation at places where dust is formed.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control	Basis	
			parameters		
Pyrene	129-00-0	TWA	0.200000	USA. Occupational Exposure Limits	
			mg/m3	(OSHA) - Table Z-1 Limits for Air	
				Contaminants	
		TWA	0.200000	USA. Occupational Exposure Limits	
			mg/m3	(OSHA) - Table Z-1 Limits for Air	
				Contaminants	
	Remarks	1910.1002			
		_	`	Z-1), coal tar pitch volatiles include	
				ons which volatilize from the	
		distillation residues of coal, petroleum (excluding asphalt), wood,			
		and other organic matter. Asphalt (CAS 8052-42-4, and CAS			
		64742-93-4) is not covered under the 'coal tar pitch volatiles'			
		standard			
			fically regulated ca		
		TWA	0.100000	USA. NIOSH Recommended	
			mg/m3	Exposure Limits	
			cupational Carcino	•	
		NIOSH considers coal tar, coal tar pitch, and creosote to be coal tar			
		products.			
		cyclohexane-extractable fraction			
		See Appendix C			
Distantantantan at		See Append	ix A		

Biological occupational exposure limits

Biological occupational exposure limits					
Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Pyrene	129-00-0	1- Hydroxypyren e (1-HP)		Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift at end of workweek			

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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

Personal protective equipment

Eve/face protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.4 mm Break through time: 480 min

Material tested: Camatril® (KCL 730 / Aldrich Z677442. Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 30 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method:

EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industria situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Respiratory protection is not required. Where protection from nuisance le (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Form: crystalline a) Appearance

Colour: yellow

No data available

b) Odour No data available c) Odour Threshold No data available No data available d) pH

e) Melting point/freezing

point

Melting point/range: 145 - 148 °C (293 - 298 °F) - lit.

Initial boiling point and

boiling range

390.0 - 395.0 °C (734.0 - 743.0 °F)

> 200.0 °C (> 392.0 °F) g) Flash point

h) Evaporation rate

Aldrich- 185515 Page 4 of 8 i) Flammability (solid, gas) No data available

i) Upper/lower flammability or explosive limits No data available

k) Vapour pressure No data availablel) Vapour density No data availablem) Relative density 1.21 g/cm3

n) Water solubility No data availableo) Partition coefficient: n- log Pow: 4.88

octanol/water

p) Auto-ignition

q) Decomposition temperature

No data available

No data available

r) Viscosity No data available s) Explosive properties No data available t) Oxidizing properties No data available

9.2 Other safety information

Bulk density 650 kg/m3

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

Risk of dust explosion.

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides

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

Dermal: No data available(Pyrene)

No data available(Pyrene)

Skin corrosion/irritation

Serious eye damage/eye irritation

Respiratory or skin sensitisation

No data available(Pyrene)

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Germ cell mutagenicity

No data available(Pyrene)

Carcinogenicity

No data available(Pyrene)

(Pyrene)

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as

probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a

known or anticipated carcinogen by NTP.

OSHA: OSHA specifically regulated carcinogen (Pyrene)

Reproductive toxicity

No data available(Pyrene)

No data available(Pyrene)

Specific target organ toxicity - single exposure

No data available(Pyrene)

Specific target organ toxicity - repeated exposure

Aspiration hazard

No data available(Pyrene)

Additional Information

RTECS: UR2450000

Inhalation studies in animals have caused:, Liver toxicity, pulmonary pathologies, intragastric pathologies, neutropenia, leukopenia, anemia, Contact with skin can cause:, hyperemia, weight loss, hematopoietic changes, Dermatitis, Chronic effects, leukocytosis(Pyrene)

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish LC50 - Oncorhynchus mykiss (rainbow trout) - > 2 mg/l - 96.0 h(Pyrene)

Toxicity to daphnia and

EC50 - Daphnia magna (Water flea) - 0.002 - 0.003 mg/l - 48 h(Pyrene)

other aquatic invertebrates

12.2 Persistence and degradability

12.3 Bioaccumulative potential

Bioaccumulation other fish - 48 h

- 0.056 mg/l(Pyrene)

Bioconcentration factor (BCF): 4,810

12.4 Mobility in soil

No data available(Pyrene)

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Very toxic to aquatic life with long lasting effects.

Avoid release to the environment.

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13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 3077 Class: 9 Packing group: III

Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (Pyrene)

Reportable Quantity (RQ) 5000 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 3077 Class: 9 Packing group: III EMS-No: F-A. S-F Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Pyrene)

Marine pollutant : yes

IATA

UN number: 3077 Class: 9 Packing group: III

Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Pyrene)

Further information

EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

SARA 302 Components

The following components are subject to reporting levels established by SARA Title III, Section 302:

CAS-No. **Revision Date** 129-00-0 2008-11-03

Revision Date

Pyrene

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.

CAS-No.

SARA 311/312 Hazards

No SARA Hazards

Massachusetts Right To Know Components

Pyrene	129-00-0	2008-11-03
Pennsylvania Right To Know Components		
	CAS-No.	Revision Date
Pyrene	129-00-0	2008-11-03

New Jersey Right To Know Components

CAS-No. Revision Date 129-00-0 2008-11-03 Pyrene

California Prop. 65 Components

WARNING! This product contains a chemical known to the CAS-No. **Revision Date** State of California to cause cancer. 129-00-0 2007-09-28

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16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

H400 Very toxic to aquatic life.

H410 Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard: 0 Chronic Health Hazard: Flammability: 0 Physical Hazard 0

NFPA Rating

Health hazard: 0 Fire Hazard: 0 Reactivity Hazard: 0

Further information

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Preparation Information

Sigma-Aldrich Corporation Product Safety - Americas Region 1-800-521-8956

Version: 6.1 Revision Date: 05/28/2017 Print Date: 06/28/2019

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SAFETY DATA SHEET

Version 4.10 Revision Date 09/23/2016 Print Date 06/28/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Selenium

Product Number : 229865
Brand : Aldrich
Index-No. : 034-001-00-2

CAS-No. : 7782-49-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich

3050 Spruce Street SAINT LOUIS MO 63103

USA

Telephone : +1 800-325-5832 Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +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 3), H301 Acute toxicity, Inhalation (Category 3), H331

Specific target organ toxicity - repeated exposure (Category 2), H373

Chronic aquatic toxicity (Category 4), H413

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)

H301 + H331 Toxic if swallowed or if inhaled

H373 May cause damage to organs through prolonged or repeated exposure.

H413 May cause long lasting harmful effects to aquatic life.

Precautionary statement(s)

P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.

P264 Wash skin thoroughly after handling.

P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.

P273 Avoid release to the environment.

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P301 + P310 + P330 IF SWALLOWED: Immediately call a POISON CENTER/doctor. Rinse

mouth.

P304 + P340 + P311 IF INHALED: Remove person to fresh air and keep comfortable for

breathing. Call a POISON CENTER/doctor.

P314 Get medical advice/ attention if you feel unwell.

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 : Se

Molecular weight : 78.96 g/mol CAS-No. : 7782-49-2 EC-No. : 231-957-4 Index-No. : 034-001-00-2

Hazardous components

Component	Classification	Concentration
Selenium		
	Acute Tox. 3; STOT RE 2; Aquatic Chronic 4; H301 + H331, H373, H413	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

No data available

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

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5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.

Provide appropriate exhaust ventilation at places where dust is formed.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Store under inert gas. Keep in a dry place.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Selenium	7782-49-2	TWA	0.2 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Eye & Upper Respiratory Tract irritation		
		TWA	0.200000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Eye & Upper Respiratory Tract irritation		
		TWA	0.200000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	0.200000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	0.2 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	0.2 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	0.2 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Upper Respiratory Tract irritation Eye irritation		

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PEL	0.2 mg/m3	California permissible exposure
		limits for chemical contaminants
		(Title 8, Article 107)

8.2 Exposure controls

Appropriate engineering controls

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method:

EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N99 (US) or type P2 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance Form: powder

Colour: light grey

b) Odourc) Odour Thresholdd) pHNo data availableNo data available

e) Melting point/freezing

point

Melting point/range: 217 °C (423 °F) - lit.

f) Initial boiling point and 684.9 °C (1,264.8 °F) - lit.

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boiling range

g) Flash point Not applicable
 h) Evaporation rate No data available
 i) Flammability (solid, gas) No data available
 j) Upper/lower No data available flammability or explosive limits

k) Vapour pressure No data availablel) Vapour density No data available

m) Relative density 4.81 g/cm3 at 25 °C (77 °F)

n) Water solubility insoluble
 o) Partition coefficient: n- log Pow: 5 octanol/water

p) Auto-ignition temperature

No data available

q) Decomposition temperature

No data available

r) Viscosity No data available
 s) Explosive properties No data available
 t) Oxidizing properties No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents, Do not store near acids., Amides, Carbides, Metals, Nickel, Nitric acid, Nitrogen trichloride, Oxygen, Potassium, Zinc

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Selenium/selenium oxides Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 6,700 mg/kg

Remarks: Behavioral:Somnolence (general depressed activity). Lungs, Thorax, or Respiration:Dyspnea. Nutritional and Gross Metabolic:Changes in:Other changes.

Inhalation: No data available Dermal: No data available

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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

Carcinogenicity - Mouse - Oral

Tumorigenic: Equivocal tumorigenic agent by RTECS criteria. Skin and Appendages: Other: Tumors.

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as

probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a

known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a

carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

No data available

Developmental Toxicity - Mouse - Oral

Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Effects on Embryo or Fetus: Fetal death.

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

May cause damage to organs through prolonged or repeated exposure.

Aspiration hazard

No data available

Additional Information

RTECS: VS7700000

anemia, Vomiting, Diarrhoea, Cough, Difficulty in breathing, Acute selenium poisoning produces central nervous system effects, which include nervousness, convulsions, and drowsiness. Other signs of intoxication can include skin eruptions, lassitude, gastrointestinal distress, teeth that are discolored or decayed, odorous ("garlic") breath, and partial loss of hair and nails. Chronic exposure by inhalation can produce symptoms that include pallor, coating of the tongue, anemia, irritation of the mucosa, lumbar pain, liver and spleen damage, as well as any of the other previously mentioned symptoms. Chronic contact with selenium compounds may cause garlic odor of breath and sweat, dermatitis, and moderate emotional instability., Dermatitis, garlic-like breath odor, pallor, nervousness, depression

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish mortality NOEC - Cyprinodon variegatus (sheepshead minnow) - 2 mg/l - 96.0

h

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mortality LOEC - Oncorhynchus mykiss (rainbow trout) - 7.8 mg/l - 96.0 h

Toxicity to daphnia and

other aquatic

invertebrates

LC50 - Daphnia magna (Water flea) - 0.43 mg/l - 48 h

Toxicity to algae EC50 - Pseudokirchneriella subcapitata - 99 mg/l - 72 h

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

Bioaccumulation Lepomis macrochirus - 60 d

- 640 µg/l

Bioconcentration factor (BCF): 7.7

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

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: 3288 Class: 6.1 Packing group: III Proper shipping name: Toxic solid, inorganic, n.o.s. (Selenium)

Reportable Quantity (RQ): 100 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 3288 Class: 6.1 Packing group: III EMS-No: F-A, S-A

Proper shipping name: TOXIC SOLID, INORGANIC, N.O.S. (Selenium)

Marine pollutant:yes

IATA

UN number: 3288 Class: 6.1 Packing group: III Proper shipping name: Toxic solid, inorganic, n.o.s. (Selenium)

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

CAS-No. Revision Date 7782-49-2 2007-07-01

SARA 311/312 Hazards

Selenium

Acute Health Hazard, Chronic Health Hazard

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Massachusetts Right To Know Components

CAS-No. Revision Date Selenium 7782-49-2 2007-07-01

Pennsylvania Right To Know Components

CAS-No. Revision Date Selenium 7782-49-2 2007-07-01

New Jersey Right To Know Components

CAS-No. Revision Date Selenium 7782-49-2 2007-07-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox. Acute toxicity

Aquatic Chronic Chronic aquatic toxicity H301 Toxic if swallowed.

H301 + H331 Toxic if swallowed or if inhaled

H331 Toxic if inhaled.

H373 May cause damage to organs through prolonged or repeated exposure.

H413 May cause long lasting harmful effects to aquatic life.

HMIS Rating

Health hazard: 2
Chronic Health Hazard: *
Flammability: 0
Physical Hazard 0

NFPA Rating

Health hazard: 2
Fire Hazard: 0
Reactivity Hazard: 0

Further information

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Preparation Information

Sigma-Aldrich Corporation Product Safety – Americas Region 1-800-521-8956

Version: 4.10 Revision Date: 09/23/2016 Print Date: 06/28/2019

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SAFETY DATA SHEET

Version 6.2 Revision Date 05/28/2017 Print Date 06/28/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Sodium

Product Number : 483745 Brand : Aldrich

CAS-No. : 7440-23-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.

3050 Spruce Street ST. LOUIS MO 63103 UNITED STATES

Telephone : +1 314 771-5765 Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Substances and mixtures, which in contact with water, emit flammable gases (Category 1), H260 Skin corrosion (Category 1B), H314

Serious eye damage (Category 1), H318

Carcinogenicity (Category 1A), H350

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)

H260 In contact with water releases flammable gases which may ignite

spontaneously.

H314 Causes severe skin burns and eye damage.

H318 Causes serious eye damage.

H350 May cause cancer.

Precautionary statement(s)	
P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P223	Keep away from any possible contact with water, because of violent reaction and possible flash fire.
P231 + P232	Handle under inert gas. Protect from moisture.
P260	Do not breathe dust or mist.
P264	Wash skin thoroughly after handling.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P281	Use personal protective equipment as required.
P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P310	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/ physician.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P335 + P334	Brush off loose particles from skin. Immerse in cool water/ wrap in wet bandages.
P363	Wash contaminated clothing before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P402 + P404	Store in a dry place. Store in a closed container.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Reacts violently with water.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.2 Mixtures

Formula : Na

Molecular weight : 22.99 g/mol

Hazardous components

Water-react. 1; Skin Corr. 1B; >= 90 - <= 100 Eye Dam. 1; H260, H314 %
, , , , , , , , , , , , , , , , , , , ,
00-0
-1

For the full text of the H-Statements mentioned in this Section, see Section 16.

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4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician. Continue rinsing eyes during transport to hospital.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Dry powder

5.2 Special hazards arising from the substance or mixture

Carbon oxides, Sodium oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust. For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wetbrushing and place in container for disposal according to local regulations (see section 13). Do not flush with water. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid formation of dust and aerosols. Further processing of solid materials may result in the formation of combu formation should be taken into consideration before additional processing

Provide appropriate exhaust ventilation at places where dust is formed. Keep away from sources of ignition - No smoking.

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For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Never allow product to get in contact with water during storage.

Handle and store under inert gas. Air sensitive.

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

•	OAC N	-		D			
Component	CAS-No.	Value	Control parameters	Basis			
Paraffin oils	8012-95-1	STEL	10.000000	USA. ACGIH Threshold Limit Values			
i didilii olis	0012-33-1	OTEL	mg/m3	(TLV)			
		TWA	5.000000	USA. Occupational Exposure Limits			
		1 7 7 7	mg/m3	(OSHA) - Table Z-1 Limits for Air			
			IIIg/III3				
		T14/4	5.000000	Contaminants			
		TWA	5.000000	USA. NIOSH Recommended			
			mg/m3	Exposure Limits			
		ST	10.000000	USA. NIOSH Recommended			
			mg/m3	Exposure Limits			
		TWA	5.000000	USA. Occupational Exposure Limits			
			mg/m3	(OSHA) - Table Z-1 Limits for Air			
				Contaminants			
		TWA	5.000000	USA. ACGIH Threshold Limit Values			
		1 * * * * * * * * * * * * * * * * * * *	mg/m3	(TLV)			
	Remarks	Hanar Dag					
	Remarks		piratory Tract irrita	auon			
		2015 Adoption					
			able as a human				
			Upper Respiratory Tract irritation				
		2015 Adoption					
		Exposure b	Exposure by all routes should be carefully controlled to levels as low				
		as possible).				
		Suspected	human carcinoge	en			
		TWA	5.000000	USA. Occupational Exposure Limits			
			mg/m3	(OSHA) - Table Z-1 Limits for Air			
			1.1.9,	Contaminants			
		TWA	5.000000	USA. Occupational Exposure Limits			
			mg/m3	(OSHA) - Table Z-1 Limits for Air			
			1119/1110	Contaminants			
		Unner Res	niratory Tract irrits				
		Upper Respiratory Tract irritation Exposure by all routes should be carefully controlled to levels as					
				d be calciully controlled to levels as low			
		as possible					
			human carcinoge				
		TWA	5.000000	USA. ACGIH Threshold Limit Values			
			mg/m3	(TLV)			
			piratory Tract irrita				
		Not classifi	able as a human	carcinogen			
		TWA	5.000000	USA. NIOSH Recommended			
			mg/m3	Exposure Limits			
		ST	10.000000	USA. NIOSH Recommended			
			mg/m3	Exposure Limits			
		Honor Boo	piratory Tract irrita				
			•	d be carefully controlled to levels as low			
		as possible.					
		Suspected	human carcinoge	en			

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TWA	5 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
TWA	5 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	iratory Tract irritation Ible as a human ca	
TWA	5 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
TWA	5 mg/m3	USA. NIOSH Recommended Exposure Limits
ST	10 mg/m3	USA. NIOSH Recommended Exposure Limits

Hazardous components without workplace control parameters

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industria situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, Flame retardant protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use (EN 143) respirator cartridges as a backup to engineering controls. If th full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance Form: Pieces

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b) Odour No data available Odour Threshold No data available No data available

e) Melting point/freezing

point

Melting point/range: 97.8 °C (208.0 °F) - lit.

Initial boiling point and boiling range

883 °C (1621 °F) - lit.

Flash point 82 °C (180 °F) h) Evaporation rate No data available Flammability (solid, gas) No data available i)

i) Upper/lower flammability or explosive limits No data available

Vapour pressure No data available Vapour density No data available

m) Relative density 0.97 g/cm3

n) Water solubility No data available o) Partition coefficient: n-No data available

octanol/water

p) Auto-ignition temperature

No data available

q) Decomposition temperature

No data available

No data available Viscosity r) No data available Explosive properties s) No data available Oxidizing properties

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 **Chemical stability**

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

Reacts violently with water.

10.4 Conditions to avoid

Air Do not allow water to enter container.

Exposure to moisture

10.5 Incompatible materials

Oxidizing agents

10.6 **Hazardous decomposition products**

Other decomposition products - No data available

Hazardous decomposition products formed under fire conditions. - Carbon oxides, Sodium oxides In the event of fire: see section 5

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11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

No data available

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as

probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a

known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a

carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: Not available

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., Aspiration may lead to:, lipid pneumonia, Effects due to ingestion may include:, laxative effect, Gastrointestinal disturbance, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

No data available

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

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12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber b highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chem scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1428 Class: 4.3 Packing group: I

Proper shipping name: Sodium

Reportable Quantity (RQ) : 10 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 1428 Class: 4.3 Packing group: I EMS-No: F-G, S-N

Proper shipping name: SODIUM

IATA

UN number: 1428 Class: 4.3 Packing group: I

Proper shipping name: Sodium

IATA Passenger: Not permitted for transport

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Reactivity Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Sodium	7440-23-5	1993-04-24
Paraffin oils	8012-95-1	2007-03-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Sodium	7440-23-5	1993-04-24
Paraffin oils	8012-95-1	2007-03-01

New Jersey Right To Know Components

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 CAS-No.
 Revision Date

 Sodium
 7440-23-5
 1993-04-24

 Paraffin oils
 8012-95-1
 2007-03-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Asp. Tox. Aspiration hazard Eye Dam. Serious eye damage

H260 In contact with water releases flammable gases which may ignite spontaneously.

H304 May be fatal if swallowed and enters airways. H314 Causes severe skin burns and eye damage.

H318 Causes serious eye damage.

H350 May cause cancer. Skin Corr. Skin corrosion

Water-react. Substances and mixtures, which in contact with water, emit flammable gases

HMIS Rating

Health hazard: 3
Chronic Health Hazard: *
Flammability: 4
Physical Hazard 2

NFPA Rating

Health hazard: 3
Fire Hazard: 4
Reactivity Hazard: 2
Special hazard.1: W

Further information

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Preparation Information

Sigma-Aldrich Corporation Product Safety – Americas Region 1-800-521-8956

Version: 6.2 Revision Date: 05/28/2017 Print Date: 06/28/2019

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SAFETY DATA SHEET

Version 4.11 Revision Date 06/28/2017 Print Date 06/22/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Tetrachloroethylene

Product Number : 371696
Brand : Sigma-Aldrich
Index-No. : 602-028-00-4

CAS-No. : 127-18-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich

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)

Skin irritation (Category 2), H315 Eye irritation (Category 2A), H319 Skin sensitisation (Category 1), H317 Carcinogenicity (Category 2), H351

Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336

Acute aquatic toxicity (Category 2), H401 Chronic aquatic toxicity (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Warning

Hazard statement(s)

H315 Causes skin irritation.

H317 May cause an allergic skin reaction.
 H319 Causes serious eye irritation.
 H336 May cause drowsiness or dizziness.
 H351 Suspected of causing cancer.

H411 Toxic to aquatic life with long lasting effects.

Sigma-Aldrich - 371696 Page 1 of 10

Precautionary statement(s)

P201 Obtain special instructions before use.

P202 Do not handle until all safety precautions have been read and

understood.

P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.

P264 Wash skin thoroughly after handling.

P271 Use only outdoors or in a well-ventilated area.

P272 Contaminated work clothing should not be allowed out of the workplace.

P273 Avoid release to the environment.

P280 Wear protective gloves/ protective clothing/ eye protection/ face

protection.

P302 + P352 IF ON SKIN: Wash with plenty of soap and water.

P304 + P340 + P312 IF INHALED: Remove person to fresh air and keep comfortable for

breathing. Call a POISON CENTER/doctor if you feel unwell.

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove

contact lenses, if present and easy to do. Continue rinsing. IF exposed or concerned: Get medical advice/ attention. If skin irritation or rash occurs: Get medical advice/ attention.

P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.
P337 + P313 If eye irritation persists: Get medical advice/ attention.
P362 Take off contaminated clothing and wash before reuse.

P391 Collect spillage.

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

P405 Store locked up.

P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

P308 + P313

Synonyms : Perchloroethylene

PCE

Formula : C_2Cl_4

 Molecular weight
 : 165.83 g/mol

 CAS-No.
 : 127-18-4

 EC-No.
 : 204-825-9

 Index-No.
 : 602-028-00-4

Hazardous components

Component	Classification	Concentration
Tetrachloroethylene		
	Skin Irrit. 2; Eye Irrit. 2A; Skin	90 - 100 %
	Sens. 1; Carc. 2; STOT SE 3;	
	Aquatic Acute 2; Aquatic	
	Chronic 2; H315, H317, H319,	
	H336, H351, H411	

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.

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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 breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

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

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Component	CAS-No.	Value	Control parameters	Basis		
Tetrachloroethylene	127-18-4	TWA	25.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)		
	Remarks	Substances (see BEI® se	ection) nimal carcinogen v 100.000000	rment a Biological Exposure Index or Indices with unknown relevance to humans USA. ACGIH Threshold Limit Values (TLV)		
				,		
		Confirmed a	nimal carcinogen v	vith unknown relevance to humans		
		Potential Occupational Carcinogen Minimize workplace exposure concentrations. See Appendix A				
		See Table Z	-2			
		TWA	100.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2		
		CEIL	200.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2		
		Peak	300.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2		
		TWA	25 ppm	USA. ACGIH Threshold Limit Values (TLV)		
		Central Nervous System impairment Substances for which there is a Biological Exposure In (see BEI® section) Confirmed animal carcinogen with unknown relevance				
		STEL	100 ppm	USA. ACGIH Threshold Limit Values (TLV)		
		Central Nervous System impairment Substances for which there is a Biological Exposure Index or Inc (see BEI® section) Confirmed animal carcinogen with unknown relevance to human				
		000 I and 2-2				

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TWA	100 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
CEIL	200 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
Peak	300 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
TWA	25 ppm 170 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
STEL	100 ppm 685 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
С	300 ppm	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
PEL	25 ppm 170 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

Biological occupational exposure limits

Diological occupation					
Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Tetrachloroethylene	127-18-4	Tetrachloroet hylene	3ppm	In end-exhaled air	ACGIH - Biological Exposure Indices (BEI)
	Remarks	Prior to shift (16 hours after exposure ceases)			
		Tetrachloroet hylene	0.5000 mg/l	In blood	ACGIH - Biological Exposure Indices (BEI)
		Prior to shift (16 hours after exposure ceases)			
		Tetrachloroet hylene	3ppm	In end-exhaled air	ACGIH - Biological Exposure Indices (BEI)
		Prior to shift (16 hours after exposure ceases)			
		Tetrachloroet hylene	0.5 mg/l	In blood	ACGIH - Biological Exposure Indices (BEI)
		Prior to shift (16 hours after exposure ceases)			

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Fluorinated rubber Minimum layer thickness: 0.7 mm Break through time: 480 min

Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.2 mm

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Break through time: 49 min

Material tested: Dermatril® P (KCL 743 / Aldrich Z677388, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multipurpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1

Information on basic physical and chemical properties Form: liquid, clear Appearance Colour: colourless b) Odour No data available Odour Threshold No data available No data available d) pН Melting point/freezing Melting point/range: -22 °C (-8 °F) - lit. point Initial boiling point and 121 °C (250 °F) - lit. f) boiling range No data available g) Flash point h) Evaporation rate No data available Flammability (solid, gas) No data available i) i) Upper/lower No data available flammability or explosive limits

25.3 hPa (19.0 mmHg) at 25.0 °C (77.0 °F) k) Vapour pressure 17.3 hPa (13.0 mmHg) at 20.0 °C (68.0 °F)

I) Vapour density No data available

m) Relative density 1.623 g/cm3 at 25 °C (77 °F) n) Water solubility 0.15 g/l at 25 °C (77 °F)

log Pow: 2.53 at 23 °C (73 °F) o) Partition coefficient: noctanol/water

p) Auto-ignition No data available temperature

q) Decomposition No data available temperature

No data available Viscosity No data available s) Explosive properties

Sigma-Aldrich - 371696 Page 6 of 10 t) Oxidizing properties No data available

9.2 Other safety information

Surface tension 32.1 mN/m at 20 °C (68 °F)

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents, Strong bases

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - female - 3,385 mg/kg

(OECD Test Guideline 401)

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation

Skin - Rabbit

Result: Skin irritation - 4 h (OECD Test Guideline 404)

Serious eye damage/eye irritation

Eyes - Rabbit

Result: Mild eye irritation - 24 h

Respiratory or skin sensitisation

- Mouse

Result: May cause sensitisation by skin contact.

(OECD Test Guideline 429)

Germ cell mutagenicity

Hamster ovary

Result: negative

OECD Test Guideline 474

Mouse - male Result: negative

Carcinogenicity

Limited evidence of carcinogenicity in animal studies

IARC: 2A - Group 2A: Probably carcinogenic to humans (Tetrachloroethylene)

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NTP: RAHC - Reasonably anticipated to be a human carcinogen (Tetrachloroethylene)

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a

carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

May cause drowsiness or dizziness.

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

Repeated dose

Mouse - female - Oral - LOAEL : 390 mg/kg

toxicity

RTECS: KX3850000

narcosis, Liver injury may occur., Kidney injury may occur.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish flow-through test LC50 - Oncorhynchus mykiss (rainbow trout) - 5 mg/l - 96 h

Toxicity to daphnia and

EC50 - Daphnia magna (Water flea) - 7.50 mg/l - 48 h

other aquatic invertebrates

Toxicity to algae static test EC50 - Skeletonema costatum - > 16 mg/l - 7 h

12.2 Persistence and degradability

Biodegradability aerobic - Exposure time 28 d

Result: 11 % - Not readily biodegradable.

(OECD Test Guideline 301C)

12.3 Bioaccumulative potential

Bioaccumulation Lepomis macrochirus (Bluegill) - 21 d

- 0.00343 mg/l

Bioconcentration factor (BCF): 49

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. 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.

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Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1897 Class: 6.1 Packing group: III

Proper shipping name: Tetrachloroethylene

Reportable Quantity (RQ): 100 lbsReportable Quantity (RQ): 100 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 1897 Packing group: III EMS-No: F-A, S-A Class: 6.1

Proper shipping name: TETRACHLOROETHYLENE

Marine pollutant: yes

IATA

UN number: 1897 Class: 6.1 Packing group: III

Proper shipping name: Tetrachloroethylene

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

CAS-No. **Revision Date** 127-18-4 2007-07-01

Tetrachloroethylene SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Reportable Quantity D039 lbs

Massachusetts Right To Know Components

CAS-No. **Revision Date**

Tetrachloroethylene 127-18-4 2007-07-01

Pennsylvania Right To Know Components

CAS-No. **Revision Date** 127-18-4 2007-07-01 Tetrachloroethylene

CAS-No. **Revision Date**

Tetrachloroethylene 127-18-4 2007-07-01

New Jersey Right To Know Components

CAS-No. **Revision Date** Tetrachloroethylene 127-18-4 2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the CAS-No. **Revision Date** State of California to cause cancer. 127-18-4 2007-09-28

Tetrachloroethylene

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute Acute aquatic toxicity Aquatic Chronic Chronic aquatic toxicity

Carcinogenicity Carc.

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Eye Irrit. Eye irritation H315 Causes skin irritation. H317 May cause an allergic skin reaction. H319 Causes serious eye irritation. May cause drowsiness or dizziness. H336 Suspected of causing cancer. H351 Toxic to aquatic life. H401 Toxic to aquatic life with long lasting effects. H411

HMIS Rating

Health hazard: 3
Chronic Health Hazard: *
Flammability: 0
Physical Hazard 0

NFPA Rating

Health hazard: 2
Fire Hazard: 0
Reactivity Hazard: 0

Further information

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Preparation Information

Sigma-Aldrich Corporation Product Safety – Americas Region 1-800-521-8956

Version: 4.11 Revision Date: 06/28/2017 Print Date: 06/22/2019

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SAFETY DATA SHEET

Version 6.1 Revision Date 05/28/2017 Print Date 06/28/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Thallium

Product Number : 277932 Brand : Aldrich Index-No. : 081-001-00-3

CAS-No. : 7440-28-0

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.

3050 Spruce Street ST. LOUIS MO 63103 UNITED STATES

Telephone : +1 314 771-5765 Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 2), H300 Acute toxicity, Inhalation (Category 2), H330 Acute aquatic toxicity (Category 3), H402 Chronic aquatic toxicity (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H300 + H330 Fatal if swallowed or if inhaled

H412 Harmful to aquatic life with long lasting effects.

Precautionary statement(s)

P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.

P264 Wash skin thoroughly after handling.

P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.

P273 Avoid release to the environment.
P284 Wear respiratory protection.

P301 + P310 + P330 IF SWALLOWED: Immediately call a POISON CENTER/doctor. Rinse

mouth.

P304 + P310 IF INHALED: Remove person to fresh air and keep comfortable for

breathing. Immediately call a POISON CENTER/doctor.

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 : T

Molecular weight : 204.38 g/mol CAS-No. : 7440-28-0 EC-No. : 231-138-1 Index-No. : 081-001-00-3

Hazardous components

Component	Classification	Concentration
Thallium		
	Acute Tox. 2; Aquatic Acute 3;	<= 100 %
	Aquatic Chronic 3; H300 +	
	H330, H412	

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

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5.2 Special hazards arising from the substance or mixture

thallium oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Further processing of solid materials may result in the formation of combu formation should be taken into consideration before additional processing Provide appropriate exhaust ventilation at places where dust is formed.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Thallium	7440-28-0	TWA	0.100000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	are proposed 2010 Revision See Notice of	d in the NIC	
		TWA	0.020000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Peripheral no Gastrointesti 2015 Adoptio Danger of cu	nal damage	n
		TWA	0.020000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Peripheral ne Gastrointesti		

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Danger of varies	Danger of cutaneous absorption varies		
TWA	0.1 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants	
Skin desi	Skin designation		
TWA	0.02 mg/m3	USA. ACGIH Threshold Limit Values (TLV)	
Gastrointe	Peripheral neuropathy Gastrointestinal damage Danger of cutaneous absorption varies		
TWA	0.1 mg/m3	USA. NIOSH Recommended Exposure Limits	
Potential	Potential for dermal absorption		

8.2 Exposure controls

Appropriate engineering controls

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industria situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use (EN 143) respirator cartridges as a backup to engineering controls. If th full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance Form: granular

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Colour: light grey

b) Odourc) Odour Thresholdd) pHNo data availableNo data available

e) Melting point/freezing

point

Melting point/range: 303 °C (577 °F) - lit.

f) Initial boiling point and

boiling range

1,457 °C (2,655 °F) - lit.

g) Flash point ()Not applicable
h) Evaporation rate No data available
i) Flammability (solid, gas) No data available

) Upper/lower flammability or explosive limits No data available

k) Vapour pressure
 l) Vapour density
 m) Relative density
 n) Water solubility
 n) Partition coefficient: nootanol/water
 No data available
 No data available
 No data available

o) Auto-ignition

No data available

temperature

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

Air sensitive.

10.5 Incompatible materials

Strong acids, Strong oxidizing agents

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - thallium oxides Other decomposition products - No data available

In the event of fire: see section 5

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11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

No data availableThallium

Dermal: No data available(Thallium)

No data available(Thallium)

Skin corrosion/irritation

No data available(Thallium)

Serious eye damage/eye irritation

No data available(Thallium)

Respiratory or skin sensitisation

No data available(Thallium)

Germ cell mutagenicity

No data available(Thallium)

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as

probable, possible or confirmed human carcinogen by IARC.

No component of this product present at levels greater than or equal to 0.1% is identified as

probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a

known or anticipated carcinogen by NTP.

No component of this product present at levels greater than or equal to 0.1% is identified as a

known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a

carcinogen or potential carcinogen by OSHA.

No component of this product present at levels greater than or equal to 0.1% is identified as a

carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

Possible risk of congenital malformation in the fetus.(Thallium)

No data available(Thallium)

Specific target organ toxicity - single exposure

No data available(Thallium)

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available(Thallium)

Additional Information

RTECS: XG3425000

The most characteristic symptom of thallium exposure is alopecia (loss of impairment of nail growth often resulting in the appearance of crescent-s Other symptoms in acute poisoning relate chiefly to the gastrointestinal system. Acute poisoning results in swelling of the feet and legs, arthral the hands and feet, mental confusion, polyneuritis with severe pain in thangina-like pains, nephritis, wasting and weakness, and lymphocytosis and peripheral nervous system abnormalities may persist including ataxia, tre disorders, memory loss, and psychoses may develop., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.(Thallium)

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Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence(Thallium)

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish LC50 - Cyprinodon variegatus (sheepshead minnow) - 21.0 mg/l - 96.0

h(Thallium)

mortality NOEC - Cyprinodon variegatus (sheepshead minnow) - 14.0 mg/l -

96.0 h(Thallium)

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available(Thallium)

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Harmful to aquatic life.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

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 chem scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 3288 Class: 6.1 Packing group: II Proper shipping name: Toxic solid, inorganic, n.o.s. (Thallium)

Reportable Quantity (RQ) : 1000 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 3288 Class: 6.1 Packing group: II EMS-No: F-A, S-A

Proper shipping name: TOXIC SOLID, INORGANIC, N.O.S. (Thallium)

IATA

UN number: 3288 Class: 6.1 Packing group: II Proper shipping name: Toxic solid, inorganic, n.o.s. (Thallium)

15. REGULATORY INFORMATION

SARA 302 Components

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No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

CAS-No. Revision Date

Thallium 7440-28-0 2007-07-01

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

CAS-No. Revision Date 7440-28-0 2007-07-01

Pennsylvania Right To Know Components

CAS-No. Revision Date

Thallium 7440-28-0 2007-07-01

New Jersey Right To Know Components

CAS-No. Revision Date

Thallium 7440-28-0 2007-07-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

H300 Fatal if swallowed.

H300 + H330 Fatal if swallowed or if inhaled

H330 Fatal if inhaled.

H402 Harmful to aquatic life.

H412 Harmful to aquatic life with long lasting effects.

HMIS Rating

Health hazard: 4
Chronic Health Hazard: *
Flammability: 0
Physical Hazard 0

NFPA Rating

Health hazard: 4
Fire Hazard: 0
Reactivity Hazard: 0

Further information

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Preparation Information

Sigma-Aldrich Corporation Product Safety – Americas Region 1-800-521-8956

Version: 6.1 Revision Date: 05/28/2017 Print Date: 06/28/2019

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SAFETY DATA SHEET

Version 4.10 Revision Date 01/04/2018 Print Date 06/28/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Trichloroethylene

Product Number : 251402
Brand : Sigma-Aldrich
Index-No. : 602-027-00-9

CAS-No. : 79-01-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, 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)

Skin irritation (Category 2), H315 Eye irritation (Category 2A), H319

Germ cell mutagenicity (Category 2), H341 Carcinogenicity (Category 1B), H350

Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336

Acute aquatic toxicity (Category 3), H402 Chronic aquatic toxicity (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)

H315 Causes skin irritation.

H319 Causes serious eye irritation.
 H336 May cause drowsiness or dizziness.
 H341 Suspected of causing genetic defects.

H350 May cause cancer.

H412 Harmful to aquatic life with long lasting effects.

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Precautionary statement(s)

P201 Obtain special instructions before use.

P202 Do not handle until all safety precautions have been read and

understood.

P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.

P264 Wash skin thoroughly after handling.

P271 Use only outdoors or in a well-ventilated area.

P273 Avoid release to the environment.
P280 Wear eye protection/ face protection.

P280 Wear protective gloves.

P281 Use personal protective equipment as required.
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.

P304 + P340 + P312 IF INHALED: Remove victim to fresh air and keep at rest in a position

comfortable for breathing. Call a POISON CENTER or doctor/ physician if

you feel unwell.

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove

contact lenses, if present and easy to do. Continue rinsing. IF exposed or concerned: Get medical advice/ attention.

P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P332 + P313 If skin irritation occurs: Get medical advice/ attention.
P337 + P313 If eye irritation persists: Get medical advice/ attention.
P362 Take off contaminated clothing and wash before reuse.

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

P405 Store locked up.

P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : TCE

Trichloroethene

Formula : C₂HCl₃

Molecular weight : 131.39 g/mol
CAS-No. : 79-01-6
EC-No. : 201-167-4
Index-No. : 602-027-00-9

Hazardous components

Component	Classification	Concentration
Trichloroethylene		
	Skin Irrit. 2; Eye Irrit. 2A; Muta. 2; Carc. 1B; STOT SE 3; Aquatic Acute 3; Aquatic Chronic 3; H315, H319, H336, H341, H350, H412	90 - 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

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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 breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Light sensitive. Handle and store under inert gas.

Storage class (TRGS 510): 6.1D: Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

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8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control	Basis			
			parameters				
Trichloroethylene	79-01-6	TWA	10.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)			
	Remarks	Central Nervous System impairment					
		cognitive decrement					
		Renal toxicity					
		Substances (see BEI® s		a Biological Exposure Index or Indices			
		Suspected h	uman carcinogen				
		STEL	25.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)			
		Central Nervous System impairment					
		cognitive decrement					
		Renal toxicity					
			Substances for which there is a Biological Exposure Index or Indices				
		(see BEI® section)					
			Suspected human carcinogen				
		Potential Occupational Carcinogen					
		See Appendix C					
		See Appendix A					
		See Table Z-2					
		TWA	100.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2			
		Z37.19-1967					
		CEIL	200.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2			
		Z37.19-1967					
		Peak	300.000000	USA. Occupational Exposure Limits			
		T Call	ppm	(OSHA) - Table Z-2			
		Z37.19-1967	737 19-1967				
		TWA	100 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2			
		Z37.19-1967					
		CEIL	200 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2			
		Z37.19-1967					
		Peak	300 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2			
		737 19-1967	Z37.19-1967				

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STEL	100 ppm 537 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
С	300 ppm	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
PEL	25 ppm 135 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

Biological occupational exposure limits

Biological occupational exposure innits						
Component	CAS-No.	Parameters	Value	Biological specimen	Basis	
	-	Trichloroaceti c acid	15.0000 mg/l	Urine	ACGIH - Biological Exposure Indices (BEI)	
	Remarks	End of shift at end of workweek				
		Trichloroetha nol	0.5000 mg/l	In blood	ACGIH - Biological Exposure Indices (BEI)	
		End of shift at end of workweek				
		Trichloroethyl ene		In blood	ACGIH - Biological Exposure Indices (BEI)	
		End of shift at end of workweek				
		Trichloroethyl ene		In end-exhaled air	ACGIH - Biological Exposure Indices (BEI)	
		End of shift at end of workweek				

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Fluorinated rubber Minimum layer thickness: 0.7 mm Break through time: 480 min

Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact

Material: Fluorinated rubber Minimum layer thickness: 0.7 mm Break through time: 480 min

Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

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Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multipurpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance Form: liquid, clear

Colour: colourless

b) Odourc) Odour ThresholdNo data available

d) pH No data available

e) Melting point/freezing

point

Melting point/range: -84.8 °C (-120.6 °F) - lit.

f) Initial boiling point and boiling range

86.7 °C (188.1 °F) - lit.

g) Flash point No data available
h) Evaporation rate No data available

i) Flammability (solid, gas) No data available

j) Upper/lower Upper explosion limit: 10.5 %(V) flammability or Lower explosion limit: 8 %(V)

explosive limits

k) Vapour pressure 81.3 hPa (61.0 mmHg) at 20.0 °C (68.0 °F)

I) Vapour density No data available

m) Relative density 1.463 g/mL at 25 °C (77 °F)

n) Water solubility No data available

o) Partition coefficient: n-

octanol/water

log Pow: 2.29log Pow: 5

p) Auto-ignition 410.0 °C (770.0 °F) temperature

Decomposition temperature

No data available

r) Viscosity No data availables) Explosive properties No data availablet) Oxidizing properties No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

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10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Oxidizing agents, Strong bases, Magnesium

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 4,920 mg/kg

LC50 Inhalation - Mouse - 4 h - 8450 ppm

LD50 Dermal - Rabbit - > 20,000 mg/kg

No data available

Skin corrosion/irritation

Skin - Rabbit

Result: Severe skin irritation - 24 h

Serious eye damage/eye irritation

Eyes - Rabbit

Result: Eye irritation - 24 h

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

Laboratory experiments have shown mutagenic effects.

In vitro tests showed mutagenic effects

Carcinogenicity

This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Possible human carcinogen

IARC: 1 - Group 1: Carcinogenic to humans (Trichloroethylene)

NTP: RAHC - Reasonably anticipated to be a human carcinogen (Trichloroethylene)

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's

list of regulated carcinogens.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

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Additional Information

RTECS: KX4550000

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, Exposure to and/or consumption of alcohol may increase toxic effects., Gastrointestinal disturbance, Kidney injury may occur., narcosis To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish LC50 - Pimephales promelas (fathead minnow) - 41 mg/l - 96.0 h

LOEC - other fish - 11 mg/l - 10.0 d

NOEC - Oryzias latipes - 40 mg/l - 10.0 d

Toxicity to daphnia and

other aquatic invertebrates

EC50 - Daphnia magna (Water flea) - 18.00 mg/l - 48 h

Toxicity to algae IC50 - Pseudokirchneriella subcapitata (green algae) - 175.00 mg/l - 96 h

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

Does not bioaccumulate.

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Harmful to aquatic life with long lasting effects.

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1710 Class: 6.1 Packing group: III

Proper shipping name: Trichloroethylene Reportable Quantity (RQ): 100 lbs Poison Inhalation Hazard: No

IMDG

UN number: 1710 Class: 6.1 Packing group: III EMS-No: F-A, S-A

Proper shipping name: TRICHLOROETHYLENE

IATA

UN number: 1710 Class: 6.1 Packing group: III

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15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

Trichloroethylene CAS-No. Revision Date 2007-07-01

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

Trichloroethylene CAS-No. Revision Date 79-01-6 2007-07-01

Pennsylvania Right To Know Components

Trichloroethylene CAS-No. Revision Date 79-01-6 2007-07-01

New Jersey Right To Know Components

Trichloroethylene CAS-No. Revision Date 79-01-6 2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.

CAS-No. Revision Date 79-01-6 2011-09-01

Trichloroethylene

WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive 79-01-6 Revision Date 2011-09-01

harm.

Trichloroethylene

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute Acute aquatic toxicity
Aquatic Chronic Chronic aquatic toxicity

Carc. Carcinogenicity
Eye Irrit. Eye irritation

H315 Causes skin irritation.

H319 Causes serious eye irritation.

H336 May cause drowsiness or dizziness. H341 Suspected of causing genetic defects.

H350 May cause cancer. H402 Harmful to aquatic life.

HMIS Rating

Health hazard: 2
Chronic Health Hazard: *
Flammability: 0
Physical Hazard 0

NFPA Rating

Health hazard: 2
Fire Hazard: 0
Reactivity Hazard: 0

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Further information

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Preparation Information

Sigma-Aldrich Corporation Product Safety – Americas Region 1-800-521-8956

Version: 4.10 Revision Date: 01/04/2018 Print Date: 06/28/2019

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SAFETY DATA SHEET

Version 6.0 Revision Date 05/28/2017 Print Date 06/28/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Zinc

 Product Number
 : 324930

 Brand
 : Aldrich

 Index-No.
 : 030-001-00-1

CAS-No. : 7440-66-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.

3050 Spruce Street ST. LOUIS MO 63103 UNITED STATES

Telephone : +1 314 771-5765 Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Pyrophoric solids (Category 1), H250

Self-heating substances and mixtures (Category 1), H251

Substances and mixtures, which in contact with water, emit flammable gases (Category 1), H260

Acute aquatic toxicity (Category 1), H400 Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H250 Catches fire spontaneously if exposed to air.

H251 Self-heating: may catch fire.

H260 In contact with water releases flammable gases which may ignite

spontaneously.

H410 Very toxic to aquatic life with long lasting effects.

Aldrich- 324930

Precautionary statement(s)

P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.

P222 Do not allow contact with air.
P223 Do not allow contact with water.

P231 + P232 Handle under inert gas. Protect from moisture.

P235 + P410 Keep cool. Protect from sunlight.
P273 Avoid release to the environment.

P280 Wear protective gloves/ eye protection/ face protection.

P335 + P334 Brush off loose particles from skin. Immerse in cool water/ wrap in wet

bandages.

P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to

extinguish.

P391 Collect spillage.

P402 + P404 Store in a dry place. Store in a closed container.

P407 Maintain air gap between stacks/ pallets.

P413 Store bulk masses greater than .? kg/ .? lbs at temperatures not

exceeding .? °C/ .? °F.

P420 Store away from other materials. P422 Store contents under inert gas.

P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Combustible dust

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula : Zn

 Molecular weight
 : 65.39 g/mol

 CAS-No.
 : 7440-66-6

 EC-No.
 : 231-175-3

 Index-No.
 : 030-001-00-1

Hazardous components

Component	Classification	Concentration
Zinc powder (pyrophoric)		
	Pyr. Sol. 1; Self-heat. 1;	<= 100 %
	Water-react. 1; Aquatic Acute	
	1; Aquatic Chronic 1; H250,	
	H251, H260, H410	

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

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4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Dry powder

5.2 Special hazards arising from the substance or mixture

Zinc/zinc oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wetbrushing and place in container for disposal according to local regulations (see section 13). Do not flush with water. Keep in suitable, closed containers for disposal. Contain spillage, pick up with an electrically protected vacuum cleaner or by wet-brushing and transfer to a container for disposal according to local regulations (see section 13).

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Further processing of solid materials may result in the formation of combu formation should be taken into consideration before additional processing

Provide appropriate exhaust ventilation at places where dust is formed. Keep away from sources of ignition - No smoking.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Never allow product to get in contact with water during storage.

Keep in a dry place.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Contains no substances with occupational exposure limit values.

Hazardous components without workplace control parameters

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Protective gloves against thermal risks

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm Break through time: 480 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method:

EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industria situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Flame retardant protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use (EN 143) respirator cartridges as a backup to engineering controls. If th full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance Form: powder

Colour: grey

b) Odourc) Odour Thresholdd) pHNo data availableNo data available

e) Melting point/freezing

point

Melting point/range: 420 °C (788 °F) - lit.

f) Initial boiling point and

boiling range

907 °C (1665 °F) - lit.

g) Flash point ()No data available

h) Evaporation rate No data available

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i) Flammability (solid, gas) May form combustible dust concentrations in air.

Upper/lower No data available

flammability or explosive limits

1 hPa at 487 °C (909 °F) k) Vapour pressure

Vapour density No data available

7.133 g/mL at 25 °C (77 °F) m) Relative density

n) Water solubility No data available

o) Partition coefficient: n-

octanol/water

log Pow: 5

p) Auto-ignition The substance or mixture is classified as self heating with the category 1.,

temperature The substance or mixture is pyrophoric with the category 1.

q) Decomposition

temperature

No data available

Viscosity No data available r) s) Explosive properties No data available No data available Oxidizing properties

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.

Possibility of hazardous reactions

Reacts violently with water.

10.4 Conditions to avoid

Exposure to moisture

10.5 Incompatible materials

Strong acids and oxidizing agents

Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Zinc/zinc oxides

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

Skin corrosion/irritation

11.1 Information on toxicological effects

Acute toxicity

No data availableZinc powder (pyrophoric)

Inhalation: No data available(Zinc powder (pyrophoric)) Dermal: No data available(Zinc powder (pyrophoric))

No data available(Zinc powder (pyrophoric))

No data available(Zinc powder (pyrophoric))

Serious eye damage/eye irritation

No data available(Zinc powder (pyrophoric))

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Respiratory or skin sensitisation

Did not cause sensitisation on laboratory animals.(Zinc powder (pyrophoric))

Germ cell mutagenicity

No data available(Zinc powder (pyrophoric))

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as

probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a

known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a

carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available(Zinc powder (pyrophoric))

No data available(Zinc powder (pyrophoric))

Specific target organ toxicity - single exposure

No data available(Zinc powder (pyrophoric))

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available(Zinc powder (pyrophoric))

Additional Information

RTECS: ZG8600000

chills, dry throat, sweet taste, Fever, Cough, Nausea, Vomiting, Weakness(Zinc powder (pyrophoric)) To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.(Zinc powder (pyrophoric))

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish LC50 - Cyprinus carpio (Carp) - 450.0 µg/l - 96.0 h(Zinc powder (pyrophoric))

Toxicity to daphnia and

other aquatic invertebrates

LC50 - Daphnia magna (Water flea) - 0.068 mg/l - 48 h(Zinc powder

(pyrophoric))

mortality NOEC - Daphnia (water flea) - 0.101 - 0.14 mg/l - 7 d(Zinc powder

(pyrophoric))

12.2 Persistence and degradability

12.3 Bioaccumulative potential

Bioaccumulation Algae - 7 d

at 16 °C - 5 μg/l(Zinc powder (pyrophoric))

Bioconcentration factor (BCF): 466

12.4 Mobility in soil

No data available(Zinc powder (pyrophoric))

2.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

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12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Very toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber b highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1436 Class: 4.3 (4.2) Packing group: II

Proper shipping name: Zinc powder

Reportable Quantity (RQ) : 1000 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 1436 Class: 4.3 (4.2) Packing group: II EMS-No: F-G, S-O

Proper shipping name: ZINC POWDER

Marine pollutant : yes

IATA

UN number: 1436 Class: 4.3 (4.2) Packing group: II

Proper shipping name: Zinc powder

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

Zinc powder (pyrophoric)

CAS-No. Revision Date
7440-66-6
1993-04-24

SARA 311/312 Hazards

Reactivity Hazard

Massachusetts Right To Know Components

Zinc powder (pyrophoric)

CAS-No. Revision Date
7440-66-6
1993-04-24

Pennsylvania Right To Know Components

Zinc powder (pyrophoric) CAS-No. Revision Date 7440-66-6 1993-04-24

New Jersey Right To Know Components

Zinc powder (pyrophoric)

CAS-No. Revision Date
7440-66-6
1993-04-24

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

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16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

H250 Catches fire spontaneously if exposed to air.

Self-heating: may catch fire. H251

H260 In contact with water releases flammable gases which may ignite spontaneously.

H400 Very toxic to aquatic life.

H410 Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard: 0 Chronic Health Hazard: Flammability: 3 Physical Hazard 1

NFPA Rating

Health hazard: 0 Fire Hazard: 3 Reactivity Hazard: 1 Special hazard.I: W

Further information

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Preparation Information

Sigma-Aldrich Corporation Product Safety - Americas Region

1-800-521-8956

Version: 6.0 Revision Date: 05/28/2017 Print Date: 06/28/2019

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White Plains Chrysler Car Dealership WHITE PLAINS, NEW YORK

COMMUNITY AIR MONITORING PROGRAM

NYSDEC BCP Site Number: C360209

Prepared for:

Saber-North White Plains, LLC c/o Saber Real Estate Advisors 80 Business Park Drive Armonk, New York 10504

Prepared by: SESI CONSULTING ENGINEERS, D.P.C. 12A Maple Avenue Pine Brook, NJ 07058

1.0 INTRODUCTION

This document presents a Community Air Monitoring Plan (CAMP) for the Remedial Investigation Workplan (RIWP) for the proposed development of the White Plains Chrysler Car Dealership (the Site). The Site consists of a 1.826-acre area parcel and is located at 70 Westchester Avenue, Westchester County, White Plains, New York. The Site is identified as 126.61-3-15.1 on the Westchester County tax map. The Site is bound by Franklin Avenue and retail businesses to the north, the White Coach Diner to the west, Westchester Avenue and the Westchester Mall to the south, and closed car dealership to the east.

The Site previously consisted of six (6) contiguous lots which have been merged on October 28, 2020. The Site is currently improved with an automotive sales and service dealer, associated building and asphalt paved parking spaces. The eastern portion of the building, which was constructed in 1925, consists of a single-story and two-story structure with small partial basement under the southeastern corner of the building. The western portion of the building which was constructed in 1990 consists of a single-story structure with a half basement. Historically, the Site was improved with residential dwellings, an automotive garage, and a machine shop, and auto sales and service facilities.

2.0 OBJECTIVES

The objective of the CAMP is to provide a measure of protection for the downwind community from potential airborne contaminant releases that may arise during all ground intrusive activities, and potentially contaminated soil and material handling and staging. In addition, the CAMP is intended to ensure that dust and contaminants are not leaving the work zone.

3.0 METHODS

The CAMP will include continuous monitoring for particulate matter (e.g., airborne "dust") and volatile organic compounds (VOCs) during the planned remedial investigation activities. Any CAMP exceedances will be reported to the NYSDEC and NYSDOH on the same business day and as soon as possible. Notification of the exceedance will be sent via email along with the reason for the exceedance, the measure(s) taken to address the exceedance, and if the exceedance was resolved. In addition, the following NYSDEC and NYSDOH personnel will be provided weekly CAMP data summaries for review.

Name	Contact Information
NYSDEC Project Manager	Parag Amin
NYSDOH Project Manager	Harolyn Hood

3.1 CONTINUOUS MONITORNG

Continues monitoring for particulates and VOCs will be conducted during all ground intrusive activities including soil borings, monitoring well installations, and soil vapor probe installations.

3.2 PERIODIC MONITORNG

Periodic monitoring for VOCs will be conducted during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection consists of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

4.0 VOC MONITORNG, RESPONSE LEVELS, AND ACTIONS

VOC Monitoring, Response Levels, and Actions Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work will be performed using a photoionization detector (PID) equipped with a 10.6 ev lamp. The equipment will be calibrated at least

daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.
- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.
- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

All 15-minute readings must be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

5.0 PARTICULATE MONITORING, RESPONSE LEVELS, AND ACTIONS

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm

to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m3 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 mcg/m3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m3 of the upwind level and in preventing visible dust migration.

All readings must be recorded and be available for State (DEC and DOH) personnel to review.

6.0 SPECIAL REQUIREMENTS FOR WORK WITHIN 20 FEET OF POTENTIALLY EXPOSED INDIVIDUAL 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 ppm, 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. Any 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 mcg/m³, work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 mcg/m³ 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 predetermined, as necessary, for each site.

Appendix G: Citizen Participation Plan (CPP)



Brownfield Cleanup Program

Citizen Participation Plan
for
White Plains Chrysler Car Dealership Site
May 2021

C360209
70 Westchester Avenue
Westchester County
White Plains, New York

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* * * * *

Note: The information presented in this Citizen Participation Plan was current as of the date of its approval by the New York State Department of Environmental Conservation. Portions of this Citizen Participation Plan may be revised during the site's investigation and cleanup process.

Applicant: Saber-North White Plains, LLC ("Applicant")
Site Name: White Plains Chrysler Car Dealership ("Site")

Site Address: 70 Westchester Avenue

Site County: **Westchester** Site Number: **C360209**

1. What is New York's Brownfield Cleanup Program?

New York's Brownfield Cleanup Program (BCP) works with private developers to encourage the voluntary cleanup of contaminated properties known as "brownfields" so that they can be reused and developed. These uses include recreation, housing, and business.

A *brownfield* is any real property that is difficult to reuse or redevelop because of the presence or potential presence of contamination. A brownfield typically is a former industrial or commercial property where operations may have resulted in environmental contamination. A brownfield can pose environmental, legal, and financial burdens on a community. If a brownfield is not addressed, it can reduce property values in the area and affect economic development of nearby properties.

The BCP is administered by the New York State Department of Environmental Conservation (NYSDEC) which oversees Applicants who conduct brownfield site investigation and cleanup activities. An Applicant is a person who has requested to participate in the BCP and has been accepted by NYSDEC. The BCP contains investigation and cleanup requirements, ensuring that cleanups protect public health and the environment. When NYSDEC certifies that these requirements have been met, the property can be reused or redeveloped for the intended use.

For more information about the BCP, go online at: http://www.dec.ny.gov/chemical/8450.html.

2. Citizen Participation Activities

Why NYSDEC Involves the Public and Why It Is Important

NYSDEC involves the public to improve the process of investigating and cleaning up contaminated sites, and to enable citizens to participate more fully in decisions that affect their health, environment, and social well-being. NYSDEC provides opportunities for citizen involvement and encourages early two-way communication with citizens before decision makers form or adopt final positions.

Involving citizens affected and interested in site investigation and cleanup programs is important for many reasons. These include:

- Promoting the development of timely, effective site investigation and cleanup programs that protect public health and the environment
- Improving public access to, and understanding of, issues and information related to a particular site and that site's investigation and cleanup process
- Providing citizens with early and continuing opportunities to participate in NYSDEC's site investigation and cleanup process
- Ensuring that NYSDEC makes site investigation and cleanup decisions that benefit from input that reflects the interests and perspectives found within the affected community
- Encouraging dialogue to promote the exchange of information among the affected/interested public, State agencies, and other interested parties that strengthens trust among the parties, increases understanding of site and community issues and concerns, and improves decision making.

This Citizen Participation (CP) Plan provides information about how NYSDEC will inform and involve the public during the investigation and cleanup of the site identified above. The public information and involvement program will be carried out with assistance, as appropriate, from the Applicant.

Project Contacts

Appendix A identifies NYSDEC project contact(s) to whom the public should address questions or request information about the site's investigation and cleanup program. The public's suggestions about this CP Plan and the CP program for the site are always welcome. Interested people are encouraged to share their ideas and suggestions with the project contacts at any time.

Locations of Reports and Information

The locations of the reports and information related to the site's investigation and cleanup program also are identified in Appendix A. These locations provide convenient access to important project documents for public review and comment. Some documents may be placed on the NYSDEC web site. If this occurs, NYSDEC will inform the public in fact sheets distributed about the site and by other means, as appropriate.

Site Contact List

Appendix B contains the site contact list. This list has been developed to keep the community informed about, and involved in, the site's investigation and cleanup process. The site contact list will be used periodically to distribute fact sheets that provide updates about the status of the project. These will include notifications of upcoming activities at the site (such as fieldwork), as well as availability of project documents and announcements about public comment periods. The site contact list includes, at a minimum:

Chief executive officer and planning board chairperson of each county, city, town

- Chief executive officer and planning board chairperson of each county, city, town and village in which the site is located;
- Residents, owners, and occupants of the site and properties adjacent to the site;
- The public water supplier which services the area in which the site is located;
- Any person who has requested to be placed on the site contact list;
- The administrator of any school or day care facility located on or near the site for purposes of posting and/or dissemination of information at the facility;
- Location(s) of reports and information.

The site contact list will be reviewed periodically and updated as appropriate. Individuals and organizations will be added to the site contact list upon request. Such requests should be submitted to the NYSDEC project contact(s) identified in Appendix A. Other additions to the site contact list may be made at the discretion of the NYSDEC project manager, in consultation with other NYSDEC staff as appropriate.

Note: The first site fact sheet (usually related to the draft Remedial Investigation Work Plan) is distributed both by paper mailing through the postal service and through DEC Delivers, its email listserv service. The fact sheet includes instructions for signing up with the appropriate county listserv to receive future notifications about the site. See http://www.dec.ny.gov/chemical/61092.html.

Subsequent fact sheets about the site will be distributed exclusively through the listserv, except for households without internet access that have indicated the need to continue to receive site information in paper form. Please advise the NYSDEC site project manager identified in Appendix A if that is the case. Paper mailings may continue during the investigation and cleanup process for some sites, based on public interest and need.

CP Activities

The table at the end of this section identifies the CP activities, at a minimum, that have been and will be conducted during the site's investigation and cleanup program. The

flowchart in Appendix D shows how these CP activities integrate with the site investigation and cleanup process. The public is informed about these CP activities through fact sheets and notices distributed at significant points during the program. Elements of the investigation and cleanup process that match up with the CP activities are explained briefly in Section 5.

- Notices and fact sheets help the interested and affected public to understand contamination issues related to a site, and the nature and progress of efforts to investigate and clean up a site.
- Public forums, comment periods and contact with project managers provide opportunities for the public to contribute information, opinions and perspectives that have potential to influence decisions about a site's investigation and cleanup.

The public is encouraged to contact project staff at any time during the site's investigation and cleanup process with questions, comments, or requests for information.

This CP Plan may be revised due to changes in major issues of public concern identified in Section 3 or in the nature and scope of investigation and cleanup activities. Modifications may include additions to the site contact list and changes in planned citizen participation activities.

Technical Assistance Grant

NYSDEC must determine if the site poses a significant threat to public health or the environment. This determination generally is made using information developed during the investigation of the site, as described in Section 5.

If the site is determined to be a significant threat, a qualifying community group may apply for a Technical Assistance Grant (TAG). The purpose of a TAG is to provide funds to the qualifying group to obtain independent technical assistance. This assistance helps the TAG recipient to interpret and understand existing environmental information about the nature and extent of contamination related to the site and the development/implementation of a remedy.

An eligible community group must certify that its membership represents the interests of the community affected by the site, and that its members' health, economic well-being or enjoyment of the environment may be affected by a release or threatened release of contamination at the site.

As of the date the declaration (page 2) was signed by the NYSDEC project manager, it has been determined that the site does not pose a significant threat.

To verify the significant threat status of the site, the interested public may contact the NYSDEC project manager identified in Appendix A.

For more information about TAGs, go online at http://www.dec.ny.gov/regulations/2590.html

Note: The table identifying the citizen participation activities related to the site's investigation and cleanup program follows on the next page:

Citizen Participation Activities	Timing of CP Activity(ies)	
Application Process:		
Prepare site contact list Establish document repository(ies)	At time of preparation of application to participate in the BCP.	
 Publish notice in Environmental Notice Bulletin (ENB) announcing receipt of application and 30-day public comment period Publish above ENB content in local newspaper Mail above ENB content to site contact list Conduct 30-day public comment period 	When NYSDEC determines that BCP application is complete. The 30-day public comment period begins on date of publication of notice in ENB. End date of public comment period is as stated in ENB notice. Therefore, ENB notice, newspaper notice, and notice to the site contact list should be provided to the public at the same time.	
After Execution of Brownfield S	Site Cleanup Agreement (BCA):	
Prepare Citizen Participation (CP) Plan	Before start of Remedial Investigation Note: Applicant must submit CP Plan to NYSDEC for review and approval within 20 days of the effective date of the BCA.	
Before NYSDEC Approves Reme	dial Investigation (RI) Work Plan:	
Distribute fact sheet to site contact list about proposed RI activities and announcing 30-day public comment period about draft RI Work Plan Conduct 30-day public comment period	Before NYSDEC approves RI Work Plan. If RI Work Plan is submitted with application, public comment periods will be combined and public notice will include fact sheet. Thirty-day public comment period begins/ends as per dates identified in fact sheet.	
After Applicant Completes Remedial Investigation:		
Distribute fact sheet to site contact list that describes RI results	Before NYSDEC approves RI Report	
Before NYSDEC Approves Remedial Work Plan (RWP):		
 Distribute fact sheet to site contact list about draft RWP and announcing 45-day public comment period Public meeting by NYSDEC about proposed RWP (if requested by affected community or at discretion of NYSDEC project manager) Conduct 45-day public comment period 	Before NYSDEC approves RWP. Forty-five day public comment period begins/ends as per dates identified in fact sheet. Public meeting would be held within the 45-day public comment period.	

Citizen Participation Activities	Timing of CP Activity(ies)	
Before Applicant Starts Cleanup Action:		
Distribute fact sheet to site contact list that describes upcoming cleanup action	Before the start of cleanup action.	
After Applicant Completes Cleanup Action:		
Distribute fact sheet to site contact list that announces that cleanup action has been completed and that NYSDEC is reviewing the Final Engineering Report	At the time the cleanup action has been completed. Note: The two fact sheets are combined when possible if there is not a delay in issuing the COC.	
Distribute fact sheet to site contact list announcing NYSDEC approval of Final Engineering Report and issuance of Certificate of Completion (COC)		

3. Major Issues of Public Concern

This section of the CP Plan identifies major issues of public concern that relate to the site. Additional major issues of public concern may be identified during the course of the site's investigation and cleanup process.

There will be areas on the Site where soil excavation is necessary. Therefore, once the remediation commences, there may be concerns regarding odors, noise or truck traffic coming from the Site. However, these impacts will be mitigated through implementation of a Health and Safety Plan and Soil Management Plan approved by the Department, which will be designed to minimize these impacts. A Community Air Monitoring Plan (CAMP) will also be implemented to monitor dust and vapors to ensure the community is not impacted. CAMP implementation involves the placement of air monitoring stations upwind and downwind of where work is occurring to capture both dust and vapor emissions. If dust or emissions exceed a set threshold established by DEC and the Department of Health, then work must cease and the cause of the issue must be corrected before work can proceed.

4. Site Information

Appendix C contains a map identifying the location of the site.

Site Description

- Location 70 Westchester Avenue, White Plains, NY, Westchester County
- Setting urban, suburban
- Site size 1.826 Acres
- Adjacent properties residential, commercial

History of Site Use, Investigation, and Cleanup

The Site has been an active car dealership with auto repair for at least the past 53 years since at least 1967. However, the on-site commercial building has been present on the Site since 1925 suggesting that this was an auto dealership dating back to potentially 1925. Some of the historical owner names suggest that a dealership or auto related use has been on the Site since at least the early 1940's. There has been some spill related remediation work on the Site since 1989. The first known report on the Site is from 1990 by O'Brien and & Gere. While this report could not be located, it was summarized in a more recent October 2000 Earth Tech Phase I summarized below. The 1990 report allegedly described the excavation and removal of 11 USTs at three areas on the Site under the supervision of the NYSDEC and the White Plains Fire Marshall. Excavation of the tanks and some soil occurred, and a total of 14

sidewall and bottom samples were taken from three excavations. Petroleum related compounds (i.e. toluene, ethylbenzene and xylene) were found in groundwater in excess of the State standards. A groundwater investigation was recommended. In 1994, S&S Environmental Sciences conducted sampling and reporting related to the remediation of two floor pits associated with wash bays in the service garage. Remediation consisted of removal of waste oil, solvents, and petroleum contaminated soil from each pit. Allegedly, the remediation of Pit A was "successful" but excavation of Pit B was halted at 7.5 feet even though contaminated soils were still present and spill # 9407257 was reported. [NOTE: According to the Spill files separately attached, work to address this spill did not occur until the early 2000's when the spill was eventually closed.] Therefore, contamination on the Site appears to be the result of residual contamination in soil, groundwater and soil vapor from the prior soils and auto repair Site uses and contaminated historic fill soils.

5. Investigation and Cleanup Process

Application

The Applicant has applied for and been accepted into New York's Brownfield Cleanup Program as a Volunteer which means that the Applicant was not responsible for the disposal or discharge of the contaminants or whose ownership or operation of the site took place after the discharge or disposal of contaminants. The Volunteer must fully characterize the nature and extent of contamination onsite, and must conduct a "qualitative exposure assessment," a process that characterizes the actual or potential exposures of people, fish and wildlife to contaminants on the site and to contamination that has migrated from the site.

The Applicant in its Application proposes that the site will be used for unrestricted purposes.

To achieve this goal, the Applicant will conduct investigation activities at the site with oversight provided by NYSDEC. The Brownfield Cleanup Agreement executed by NYSDEC and the Applicant sets forth the responsibilities of each party in conducting these activities at the site.

Investigation

The Applicant will conduct an investigation of the site officially called a "remedial investigation" (RI). This investigation will be performed with NYSDEC oversight. The Applicant must develop a remedial investigation workplan, which is subject to public comment.

The site investigation has several goals:

- 1) Define the nature and extent of contamination in soil, surface water, groundwater and any other parts of the environment that may be affected;
- 2) Identify the source(s) of the contamination;
- Assess the impact of the contamination on public health and the environment;
 and
- 4) Provide information to support the development of a proposed remedy to address the contamination or the determination that cleanup is not necessary.

The Applicant submits a draft "Remedial Investigation Work Plan" to NYSDEC for review and approval. NYSDEC makes the draft plan available to the public review during a 30-day public comment period.

When the investigation is complete, the Applicant will prepare and submit a report that summarizes the results. This report also will recommend whether cleanup action is needed to address site-related contamination. The investigation report is subject to review and approval by NYSDEC.

NYSDEC will use the information in the investigation report to determine if the site poses a significant threat to public health or the environment. If the site is a "significant threat," it must be cleaned up using a remedy selected by NYSDEC from an analysis of alternatives prepared by the Applicant and approved by NYSDEC. If the site does not pose a significant threat, the Applicant may select the remedy from the approved analysis of alternatives.

Interim Remedial Measures

An Interim Remedial Measure (IRM) is an action that can be undertaken at a site when a source of contamination or exposure pathway can be effectively addressed before the site investigation and analysis of alternatives are completed. If an IRM is likely to represent all or a significant part of the final remedy, NYSDEC will require a 30-day public comment period.

Remedy Selection

When the investigation of the site has been determined to be complete, the project likely would proceed in one of two directions:

1. The Applicant may recommend in its investigation report that no action is necessary at the site. In this case, NYSDEC would make the investigation report available for public comment for 45 days. NYSDEC then would complete its review, make any necessary revisions, and, if appropriate, approve the investigation report. NYSDEC would then issue a "Certificate of Completion" (described below) to the Applicant.

or

2. The Applicant may recommend in its investigation report that action needs to be taken to address site contamination. After NYSDEC approves the investigation report, the Applicant may then develop a cleanup plan, officially called a "Remedial Work Plan". The Remedial Work Plan describes the Applicant's proposed remedy for addressing contamination related to the site.

When the Applicant submits a draft Remedial Work Plan for approval, NYSDEC would announce the availability of the draft plan for public review during a 45-day public comment period.

Cleanup Action

NYSDEC will consider public comments, and revise the draft cleanup plan if necessary, before approving the proposed remedy. The New York State Department of Health (NYSDOH) must concur with the proposed remedy. After approval, the proposed remedy becomes the selected remedy. The selected remedy is formalized in the site Decision Document.

The Applicant may then design and perform the cleanup action to address the site contamination. NYSDEC and NYSDOH oversee the activities. When the Applicant completes cleanup activities, it will prepare a final engineering report that certifies that cleanup requirements have been achieved or will be achieved within a specific time frame. NYSDEC will review the report to be certain that the cleanup is protective of public health and the environment for the intended use of the site.

Certificate of Completion

When NYSDEC is satisfied that cleanup requirements have been achieved or will be achieved for the site, it will approve the final engineering report. NYSDEC then will issue a Certificate of Completion (COC) to the Applicant. The COC states that cleanup goals have been achieved and relieves the Applicant from future liability for site-related contamination, subject to certain conditions. The Applicant would be eligible to redevelop the site after it receives a COC.

Site Management

The purpose of site management is to ensure the safe reuse of the property if contamination will remain in place. Site management is the last phase of the site cleanup program. This phase begins when the COC is issued. Site management incorporates any institutional and engineering controls required to ensure that the

remedy implemented for the site remains protective of public health and the environment. All significant activities are detailed in a Site Management Plan.

An *institutional control* is a non-physical restriction on use of the site, such as a deed restriction that would prevent or restrict certain uses of the property. An institutional control may be used when the cleanup action leaves some contamination that makes the site suitable for some, but not all uses.

An *engineering control* is a physical barrier or method to manage contamination. Examples include: caps, covers, barriers, fences, and treatment of water supplies.

Site management also may include the operation and maintenance of a component of the remedy, such as a system that pumps and treats groundwater. Site management continues until NYSDEC determines that it is no longer needed.

Appendix A -**Project Contacts and Locations of Reports and Information**

Project Contacts

For information about the site's investigation and cleanup program, the public may contact any of the following project staff:

New York State Department of Environmental Conservation (NYSDEC):

Parag Amin **Project Manager NYSDEC** Division of Environmental Remediation 21 South Putt Corners Rd New Paltz. NY 12561-1620 Parag.amin@dec.ny.gov

New York State Department of Health (NYSDOH):

Harolyn Hood **Project Manager** NYSDOH **Empire State Plaza** Corning Tower Room 1787 Albany, NY 12237 (518) 473-4780 beei@health.ny.gov

Locations of Reports and Information

The facilities identified below are being used to provide the public with convenient access to important project documents:

White Plains Public Library 100 Martine Avenue White Plains, NY 10601 Attn: Brian Kenney, Director Phone: (914) 422-1400

Hours:

Mon-Thu 10am-7pm Fri-Sat 10am-5pm

Closed Sunday

Repositories may be temporarily unavailable due to

COVID-19 precautions. You can get information about this Site at

https://www.dec.nv.gov/cfmx/extapps/derexternal/inde x.cfm/C360209.

If you cannot access the online repository at https://gisservices.dec.ny.gov/gis/dil/, and specifically the link to the documents in relation to this site at https://www.dec.ny.gov/data/DecDocs/C360209/ please contact the NYSDEC project manager listed above for assistance. Type in the site address when accessing this website and then click on DEC Information Layers link. In this link, click "Environmental Cleanup" and check all of the boxes.

Then zoom in to see the documents of this site.

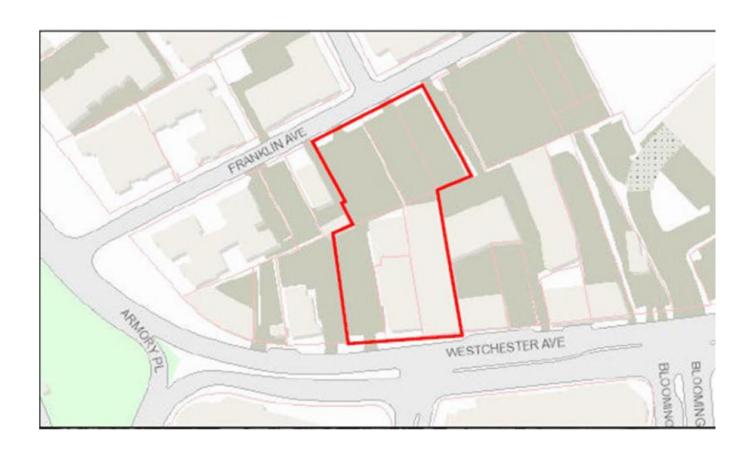
Appendix B - Site Contact List

Federal and State Officials			
Chuck E. Schumer U.S. Senate 780 Third Avenue, Suite 2301 New York, NY 10017 cschumer@nysenate.gov	Kirsten Gillibrand U.S. Senate 780 Third Avenue, Suite 2601 New York, NY 10017 kgillibrand@nysenate.gov	Sarah Crowell NYS DOS Department of Planning and Development, Director 1 Commerce Place, 99 Washington Ave, Suite 1010 Albany, NY 12231	
Nita M. Lowey U.S. House of Representatives, 17th District 222 Mamaroneck Avenue, Suite 312 White Plains, NY 10605 Nlowey@congress.gov	Andrea Stewart-Cousins New York State Senator, District 35 28 Wells Avenue, Building #3 Yonkers, NY 10701 scousins@nysenate.gov	George Latimer Westchester County Executive 148 Martine Avenue White Plains, NY 10601 ce@westchestergov.com	
Richard Hyman Westchester County Planning Board, Chair 148 Martine Avenue, Room 432 White Plains, NY 10601 rh@westchestergov.com	Thomas Roach Mayor of the City White Plains 255 Main Street White Plains, NY 10601 mayorsoffice@whiteplainsny.go v	Christopher Gomez City of White Plains, Department of Planning, Commissioner 70 Church Street White Plains, NY 10601 Christopher.gomez@dos.ny.go v	
Media Outlets			
The Journal News- Westchester Media Outlet 1133 Westchester Avenue, Suite N110 White Plains, NY 10604 tjn-lhlegals@gannett.com			
Public Water Supplier			
Katie Marino Mount Kisco Water Bureau, Public Water Supplier	Westchester Joint Water Works Westchester Public Water Supplier		

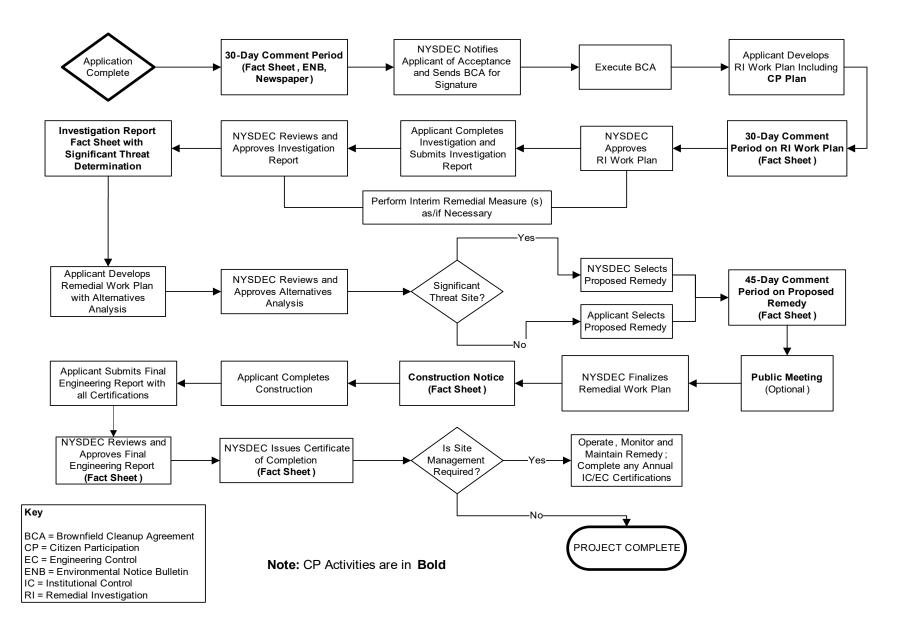
Village Hall (1st Floor) ,104	1625 Mamaroneck Ave		
Main Street	Mamaroneck, NY 10543		
Mount Kisco, NY 10549	<u>health.westchestergov.com</u>		
kmarino@mountkiscony.gov			
	chools and Daycare Centers		
Dr. Daisy Rodriguez	Ryan Monk	Ebony Tronsoso	
Principal of WPMS -	Head of School of Fusion	Director of Children's	
Eastview Campus	Academy	Corner Learning Center	
350 Main Street	1 North Broadway, Suite	120 Bloomingdale Road	
White Plains, NY 10601	120	White Plains, NY 10605	
daisyrodriguez@wpcsd.k12.ny.u	White Plains, NY 10601	<u>childrenscornergroup.com</u>	
<u>S</u>	www.fusionacademy.com/campe		
Kathy Halas	<u>S</u>		
Director of Westchester			
Child Day Care			
143 Grand Street			
White Plains, NY 10601			
kathyh@cccwny.org			
T. Control of the con	Adjacent Property Owners and Operators		
Adjace	nt Property Owners and Ope	rators	
Adjace Franklin Plains Corporation	nt Property Owners and Ope Hony Housing	rators City of White Plains	
Franklin Plains Corporation	Hony Housing	City of White Plains	
Franklin Plains Corporation Adjacent Property Owner	Hony Housing Development Fund	City of White Plains Adjacent Property Owner	
Franklin Plains Corporation Adjacent Property Owner and Operator of 25	Hony Housing Development Fund Adjacent Property Owner of	City of White Plains Adjacent Property Owner of 50 Franklin	
Franklin Plains Corporation Adjacent Property Owner and Operator of 25 Franklin Avenue	Hony Housing Development Fund Adjacent Property Owner of 40 Windsor Terrace	City of White Plains Adjacent Property Owner of 50 Franklin 255 Main Street	
Franklin Plains Corporation Adjacent Property Owner and Operator of 25 Franklin Avenue 25 Franklin Avenue	Hony Housing Development Fund Adjacent Property Owner of 40 Windsor Terrace 59 Rutledge Road	City of White Plains Adjacent Property Owner of 50 Franklin 255 Main Street	
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White Plains Coach Diner Adjacent Property Operator of 50 Westchester Avenue 50 Westchester Avenue White Plains, NY 10601	Westchester Burger Company Adjacent Property Operator of 106 Westchester Avenue 106 Westchester Avenue White Plains, NY 10601	The Westchester Shopping Map SIMON Property Group Inc. Adjacent Property Operator if 125 Westchester Avenue 399 Park Avenue, 29th Floor New York, New York 10022
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Appendix C - Site Location Map



Appendix D- Brownfield Cleanup Program Process





oximes Urban oximes Suburban oximes Rural

☐ Medium

□ Low

c. Population density around site:

⊠ High

Division of Environmental Remediation

Remedial Programs Scoping Sheet for Major Issues of Public Concern (see instructions)

Scoping Sheet for Major Issues of Public Concern (see instructions)			
Site Name: White Plains Chrysler Car Dealership Site			
Site Number: C360209			
Site Address and County: 70 Westchester Avenue, White Plains, NY, Westchester County Remedial Party(ies): Saber-North White Plains, LLC			
Note: For Parts 1. $-$ 3. the individuals, groups, organizations, businesses, and units of government identified should be added to the site contact list as appropriate.			
Part 1. List major issues of public concern and information the community wants. Identify individuals, groups, organizations, businesses and/or units of government related to the issue(s) and information needs.			
The list of potential impacts contained in the CPP are typical impacts of remediation on brownfield sites			
How were these issues and/or information needs identified? See response above.			
Part 2. List important information needed from the community, if applicable. Identify individuals, groups, organizations, businesses and/or units of government related to the information needed. Nothing is needed from the community at this time			
How were these information needs identified? NA			
Part 3. List major issues and information that need to be communicated to the community. Identify individuals, groups, organizations, businesses and/or units of government related to the issue(s) and/or information. Communication of each step in the BCP process must be communicated in Fact Sheets and public hearings if required.			
How were these issues and/or information needs identified? This is part of the CPP process			
Part 4. Identify the following characteristics of the affected/interested community. This knowledge will help to identify and understand issues and information important to the community, and ways to effectively develop and implement the site citizen participation plan (mark all that apply):			
a. Land use/zoning at and around site: ☑ Residential □ Agricultural □ Recreational ☑ Commercial □ Industrial			
b Residential type around site:			

 d. Water supply of nearby residences: ☑ Public ☐ Private Wells ☐ Mixed 		
e. Is part or all of the water supply of the affected/interested co \square Yes \boxtimes No	ommunity currently impacted by the site?	
Provide details if appropriate: Click here to enter text.		
f. Other environmental issues significantly impacted/impacting \square Yes \boxtimes No	the affected community?	
Provide details if appropriate: Click here to enter text.		
g. Is the site and/or the affected/interested community wholly \Box Yes \boxtimes No	or partly in an Environmental Justice Area′	
h. Special considerations: ☑ Language □ Age □ Transportation □ Other		
Explain any marked categories in h : Factsheets for this site will be translated into Spanish to I	provide access to the local population	
Part 5. The site contact list must include, at a minimum, the in identified in Part 2. of the Citizen Participation Plan under 'Site groups, organizations, and units of government affected by, or program? (Mark and identify all that apply, then adjust the site	e Contact List'. Are <i>other</i> individuals, rinterested in, the site, or its remedial	
☐ Non-Adjacent Residents/Property Owners: Click here to	enter text.	
☐ Local Officials: Click here to enter text.		
☐ Media: Click here to enter text.		
☐ Business/Commercial Interests: Click here to enter text.		
☐ Labor Group(s)/Employees: Click here to enter text.		
☐ Indian Nation: Click here to enter text.		
☐ Citizens/Community Group(s): Click here to enter text.		
☐ Environmental Justice Group(s): Click here to enter text.		
☐ Environmental Group(s): Click here to enter text.		
☐ Civic Group(s): Click here to enter text.		
☐ Recreational Group(s): Click here to enter text.		
☐ Other(s): Click here to enter text.		
Prepared/Updated By: Linda R. Shaw, Esq.	Date: May 25,2021	
Reviewed Approved By: Click here to enter text.	Date: Click here to enter text.	